Jayne-



## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street P.O. Box 6015 Indianapolis 46206-6015 Telephone 317/232-8603

VIA CERTIFIED MAIL - P730-169-944

February 23, 1990

Mr. Michael T. Scanlon
Director of Environmental Services
Ulrich Chemical, Inc.
3111 North Post Road
Indianapolis, Indiana 46226-6566

Re: Closure of Container Storage Units Ulrich Chemical, Inc. Evansville, Indiana IND 044198034

Dear Mr. Scanlon:

The Indiana Department of Environmental Management (IDEM) has received your certification that total closure has been completed as outlined in the approved closure plan for the container storage units (SO1) located at the Evansville facility. The IDEM has also received your letter dated January 19, 1990, which resolves possible discrepancies found in the Certification Report. With the receipt of this certification and subsequent information, total closure is complete as required by 329 IAC 3-21.

Ulrich Chemical, Inc., Evansville, Indiana, originally notified the U.S. Environmental Protection Agency, Region V, as a hazardous waste container storage facility. With the completion of closure, that hazardous waste management activity has been eliminated. The approved closure plan indicates that Ulrich will maintain status as a generator and transporter of hazardous waste.

This is also to notify you that your facility is no longer required by 329 IAC 3-22-4 to maintain financial assurance for the closure of the Evansville and Fort Wayne facilities. On January 12, 1990, the IDEM acknowledged that closure of your Fort Wayne facility was considered complete.



Mr. Michael T. Scanlon Page 2

If you have any questions regarding this matter, please contact Ms. Jayne E. Browning at AC 317/232-3397.

Sincerely,

Bruce H Palin Bruce H. Palin

Acting Assistant Commissioner for Solid and Hazardous Waste Management

cc: Vanderburgh County Health Department

Mr. Hak Cho, U.S. EPA, Region V

Ms. Fayola Wright, U.S. EPA, Region V

Mr. Jeff Stevens Ms. Jenny Dooley

Mr. James Hunt

#### CORPORATE OFFICE

3111 NORTH POST ROAD INDIANAPOLIS 46226-6566 (317) 898-8632 FAX (317) 895-0614

## WILIRIICIHI CIHIEMIIICAIL, IINC.



**BRANCHES** 

EVANSVILLE TERRE HAUTE FORT WAYNE LOUISVILLE

January 2, 1990

Mr. Gordon Garcia U.S. E.P.A. 5 HR - 12 230 South Dearborn Street Chicago, IL 60604

Dear Mr. Garcia:

Enclosed is a copy of the Closure Report for Ulrich Chemical, Inc.'s Evansville facility which you requested. This is being submitted in response to the Notice of Violation which you sent our office concerning the Land Disposal Restriction (Waste Analysis Plan.)

If you have any questions or require additional information, please feel free to contact me at 317-898-8632

Sincerely

Michael T. Scanlon

Director of Environmental Services

Much T. Lac

MTS/js

Enclosure





#### INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street P.O. Box 6015

46206-6015 Indianapolis 317-232-8603 Telephone

September 20, 1989

VIA CERTIFIED MAIL - P730-167-556

Mr. Michael T. Scanlon Director of Environmental Services Ulrich Chemical, Inc. 3111 North Post Road Indianapolis, Indiana 46226-6566

> Re: Ulrich Chemical, Inc. Evansville, Indiana IND 044198034

Dear Mr. Scanlon:

The Indiana Department of Environmental Management (IDEM) has reviewed your September 7, 1989, request to extend the closure time period an additional ninety (90) days. The request is approved and the deadline for the completion of closure is ninety (90) days beyond September 25, 1989.

The extension will allow your facility to continue clean closure activities. Thus far, the cleanup standard has not been achieved due to unanticipated metals results. The extension will also allow your facility time to investigate the source of metals which was unexpected due to the types of wastes stored.

If you have any further questions regarding this matter, please contact Ms. Jayne E. Browning at AC 317/232-3397.

Very truly yours,

Linda L. Bobo, Acting Chief Plan Review and Permit Section

Hazardous Waste Management Branch Solid and Hazardous Waste Management

cc: Mr. Hak Cho, U.S. EPA, Region V

GUS 6/000 please file thanks!





## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

NANCY A. MALOLEY, Commissioner

105 South Meridian Street Indianapolis

VIA CERTIFIED MAIL - P652-575-102 Mr. Michael T. Scanlon Mr. Michael T. Scanlon

Director of Environmental Services

Ulrich Chemical, Inc. 3111 North Post Road

Indianapolis, Indiana 46226-6506

P.O. Box 6015 46206-6015 Telephone 317-232-8603

January 18, 1989

Re: Notice of Deficiency Ulrich Chemical, Inc. Evansville, Indiana

IND 044198034

Dear Mr. Scanlon:

The amended closure plan, dated December 27, 1988, for Ulrich Chemical, Inc.'s Evansville facility has been reviewed by the Indiana Department of Environmental Management (IDEM). The plan was revised in response to the November 23, 1988 Notice of Deficiency. The closure plan should be further revised to respond to the following comments:

- A cleanup level was not specified for the old storage area; the plan 1. speaks only in terms of a "level of concern." Acceptable cleanup levels are background for inorganic compounds and detection limits for organic compounds.
- 2. The plan proposes a cleanup standard of two (2) times the detection limit for the current storage area. The proposed cleanup limit is not acceptable. The steam cleaning procedure should be repeated until drinking water standards are achieved for the metals and detection limits are achieved for organic compounds.

The revised closure plan should be submitted to the IDEM within thirty (30) days of your receipt of this letter.

If you have any questions, please contact Ms. Jayne E. Browning at 317/232-3397.

Very truly yours,

Thomas Linson, Chief

Plan Review/Permit Section

Hazardous Waste Management Branch Solid and Hazardous Waste Management

cc: Hak Cho, U.S. EPA, Region V Bernie Orenstein, U.S. EPA, Region V Vanderburgh County Health Department





NANCY A. MALOLEY, Commissioner Waste Management Division U.S. EPA, REGION V

105 South Meridian Street P.O. Box 6015

Indianapolis 46206-6015 317-232-8603 Telephone

November 23, 1988

P395-654-971 VIA CERTIFIED MAIL

Mr. Michael T. Scanlon Director of Environmental Services Ulrich Chemical, Inc. 3111 North Post Road Indianapolis, Indiana 46226-6566

> Notice of Deficiency Re:

Ulrich Chemical, Inc. Evansville, Indiana IND 044198034

Dear Mr. Scanlon:

The amended closure plan dated November 1, 1988, for Ulrich Chemical, Inc's., Evansville facility has been reviewed by the Indiana Department of Environmental Management (IDEM). The enclosure outlines review comments which should be addressed in a revised closure plan. The revised plan should be submitted to the IDEM within thirty (30) days of your receipt of this letter.

If you have any questions, please contact Ms. Jayne E. Browning at AC 317/232-3397.

Very truly yours,

Thomas L. Russell, Chief

Hazardous Waste Management Branch Solid and Hazardous Waste Management

JEB/drc

Enclosure

cc: Mr. Hak Cho, U.S. EPA, Region V (with enclosure) Mr. Bernie Orenstein, U.S. EPA, Region V Vanderburgh County Health Department (with enclosure)

An Equal Opportunity Employer





### INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT NANCY A. MALOLEY, Commissioner

105 South Meridian Street P.O. Box 6015 Indianapolis 46206-6015 Telephone 317-232-8603

November 22, 1988

Legal Advertising Department Evansville Courier and Press P.O. Box 268 201 Northwest Second Street Evansville, Indiana 47702

> Re: Public Notice of Closure Ulrich Chemical, Inc.

IND 044198034

Dear Sir/Madam:

Enclosed is a copy of our public notice of closure for Ulrich Chemical, Inc., Evansville, Indiana. Please publish this notice, one time, on November 28, 1988.

Please provide a notarized form and clippings showing the date of publication. All charges should be billed to the Department of Environmental Management, Office of Solid and Hazardous Waste Management. If a separate invoice is sent, be sure to include the publication date of the notice on the invoice.

Your timely attention to this matter is appreciated.

Very truly yours,

Thomas E. Linson, Chief

Plan Review and Permit Section hazardous Waste Management Branch Solid and Hazardous Waste Management

JS/drc

Enclosure

cc: Ms. Nancy Maloley (with enclosure)

Mr. Wayne Penrod (with enclosure)

Ms. Catherine Lynch (with enclosure)
Mr. Thomas Russell (with enclosure)

Ms. Carmen Bryant (with enclosure)

Mr. Hak Cho, U.S. EPA, Region V Mr. Bernie Orenstein, U.S. EPA, Region V

Ms. Jayne Browning (with enclosure)

File ICIC (with enclosure)

FILE

## INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

NANCY A. MALOLEY, Commissioner



35.65

105 South Meridian Street

P.O. Box 6015

Indianapolis 462 Telephone 317-2

46206-6015 317-232-8603

Mr. Mick Fuhry, Environmental Supervisor Occidental Chemical Corporation 1008 State Highway 131 East Jeffersonville, Indiana 47130

March 21, 1988

Re:

Closure Plan

Occidental Chemical Corporation

New Albany, Indiana IND 006371173

Dear Mr. Fuhry:

This will acknowledge receipt of a closure plan from your company. The closure plan has been reviewed for completeness and determined to be deficient pursuant to 320 IAC 4.1.

The attached Notice of Deficiency (NOD) outlines the specific deficiencies and provides discussion relevant to the revision. The information requested must be submitted, in full, as an amended plan.

The amended plan must be sent to this office within sixty (60) days of the date of receipt of this notice.

If you have any questions, please contact Mr. John Hale at AC 317/232-3220.

Very truly yours,

Thomas E. Linson, Acting Chief Plan Review and Permit Section Hazardous Waste Management Branch

Solid and Hazardous Waste Management

JH/rm

Enclosure

cc: Mr. Hak Cho, U.S. EPA, Region V V Clark County Health Department



8021 CASTLETON RD. INDIANAPOLIS, IN 46250 TEL (317) 579-7400 FAX (317) 579-7410

Mr. Michael T. Scanlon Director of Environmental Services Ulrich Chemical, Inc. 3111 North Post Road Indianapolis, IN 46226-6566

Re: Final Report
Closure Plan Implementation
Ulrich Chemical, Inc.
Evansville, Indiana
Hoosier Project Number 89059

Dear Mr. Scanlon,

Please find enclosed the final report for the closure of the hazardous waste storage units located at Ulrich's Evansville, Indiana facility. This report documents the activities performed during this investigation and presents our findings relative to the site.

We trust this submittal is responsive to your needs. Please do not hesitate to contact us if you have any questions or comments regarding this report.

Sincerely,

Michael F. Casper Project Hydrogeologist

Bryan K. Petriko, P.E.

Senior Environmental Engineer

Draft Report
Closure Plan Implementation
Ulrich Chemical, Inc.
Evansville, Indiana
Hoosier Project Number 89059

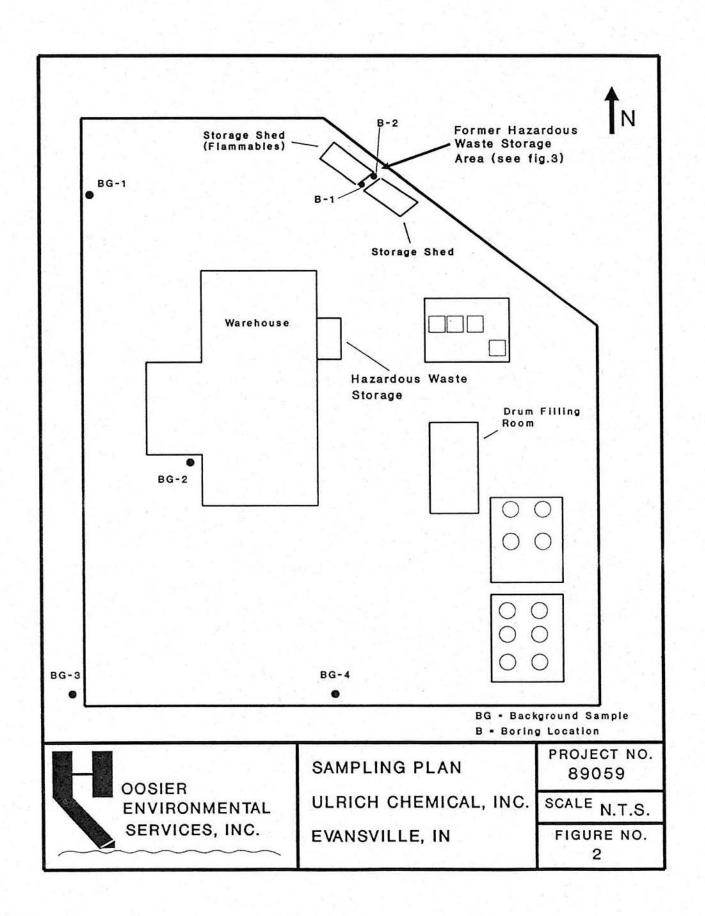
#### INTRODUCTION

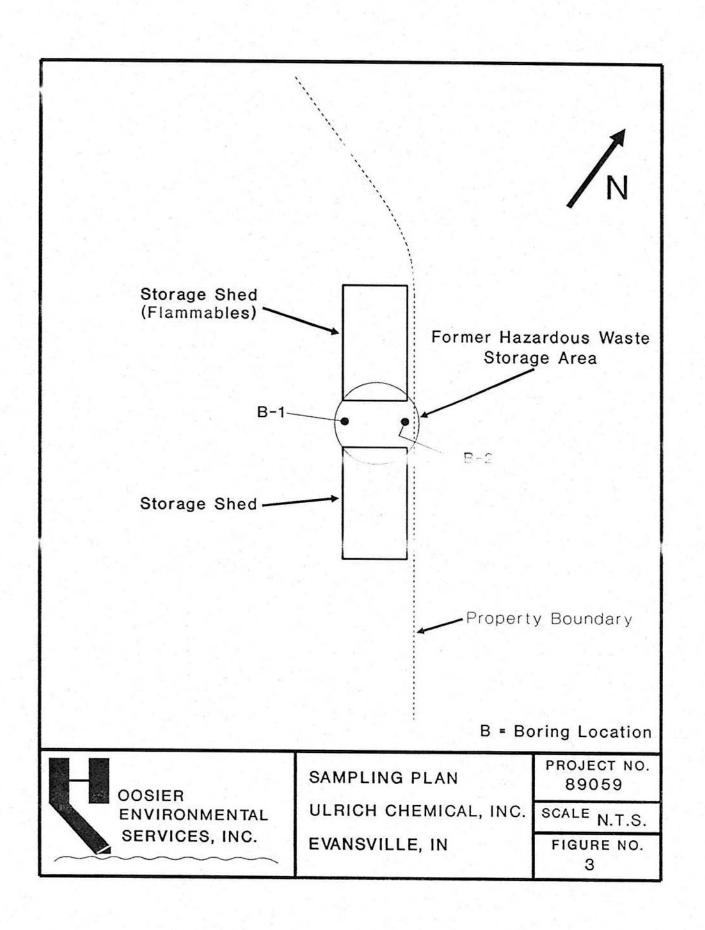
Hoosier Environmental Services, Inc. (Hoosier) was retained by Ulrich Chemical Company, Inc. (Ulrich) to implement the closure of two interim status hazardous waste storage facilities at Ulrich's Evansville, Indiana facility. These are referred to as the former (or past) and the current storage areas. The closure involved: a) the collection and analysis of soil samples from within the former hazardous waste storage area, and; b) pressure washing of the cement pad from within the current storage area. The closure activities were conducted in accordance with the closure plan supplied by Ulrich as amended and approved by the Indiana Department of Environmental Management (IDEM). This report documents the activities performed on site and presents our findings and conclusions relative to the site.

#### BACKGROUND INFORMATION

Ulrich is primarily involved in the warehousing and distribution of virgin chemical products to municipal and industrial users. In certain instances, spent chemical wastes from Ulrich's customers are accepted for short term storage at its interim status storage facilities prior to ultimate disposal or treatment off-site. Ulrich has maintained a current and a former interim status storage facility at its Evansville, Indiana facility. The location of the Evansville facility is shown in Figure 1 while the location of the former and current storage areas within the facility are shown in Figures 2 and 3.

Ulrich has not performed any on site filling or emptying of hazardous waste containers in the storage units except if a drum in storage required repackaging to prevent leakage. The waste management activities at the facility consisted solely of containerized storage. The maximum inventory of wastes that could be stored at the Evansville facility is the process design capacity identified in Part A Form 3510-3 of the Federal Consolidated Permit Application submitted by Ulrich. The original process design capacity for the Evansville facility was 3,300 gallons (sixty 55-gallon drums). This capacity was increased in 1987 to 4,400 gallons (eighty





55-gallon drums). In most instances less than the maximum quantity of material was in storage at the facility at any time.

The areas subject to closure are the current and past interim storage areas within the Ulrich facility. The current storage area consists of a 15 ft by 30 ft area located on the east side of the main warehouse. The base of the current storage area is concrete and is surrounded on three sides by a curb and by a drain trough on the fourth side. The past storage area consisted of an 18 ft long area located south of the North Barrel Storage Building. Part of the past storage area is currently covered by the concrete base of the south storage building. The base of the past storage unit was soil.

Ulrich no longer intends to store hazardous waste at its Evansville facility, so it has decided to close the storage area in accordance with closure standards found in 329 IAC 3-21-2. The closure plan has been written by Ulrich and modified and approved by IDEM. Hoosier was retained to conduct the closure activities and certify the closure.

#### CLOSURE ACTIVITIES

order to evaluate the storage areas, a series of incremental steps were outlined in the closure plan. These steps allowed for the logical progression of activities which could be evaluated and documented. Prior to implementation of on-site activities, several preliminary work tasks were conducted. Ulrich removed or contracted for the removal of the final volume of hazardous wastes within the Evansville facility. Ulrich then contracted Hoosier to implement the decontamination and closure sampling and analysis tasks. The first Hoosier work task involved development of a site safety plan to provide the appropriate precautions and to establish procedures to minimize the risk for personnel exposure during sampling and decontamination activities. The procedures set forth in the safety plan were reviewed and adhered to during all on-site activities. A copy of the site safety plan can be provided upon request.

#### Past Storage Area

In order to determine if there were any residual impacts from operation of the past storage unit, Hoosier collected samples at two locations within the storage area and at four background locations across the plant site. The sample locations are shown in Figure 2. The sampling program, laboratory test results and findings are present below.

Table 2
Analytical Results - Soil Sampling

Sample	_As_	_Ba_	_Cd_	Cr	Pb	Hq	Se	_Aq_	Cn*
BG-1	3.0	72	0.30	12	27	<0.30	<0.60	<0.50	<2
BG-2	4.0	74	0.24	16	28	<0.30	<0.70	<0.50	<2
BG-3	4.2	104	0.25	16	31	<0.28	<0.67	<0.50	<3
BG-4	3.1	99	0.16	16	27	<0.28	<0.60	<0.50	<2
B1-A	<0.5	22	0.44	8.0	6.5	<0.28	<0.67	<0.50	<2
B1-B	1.4	61	0.38	9.8	15	<0.28	<0.69	<0.50	<2
B1-C	3.0	105	0.29	19	29	<0.28	<0.64	<0.50	<2
B1-D	2.8	133	0.23	18	28	<0.28	<0.71	<0.50	<1
B2-A	2.9	111	0.36	16	26	<0.28	<0.65	<0.50	<2
B2-B	2.2	90	0.38	17	23	<0.28	<0.67	<0.50	<2
B2-C	4.0	163	0.40	16	28	<0.28	<0.66	<0.50	<2
B2-D	2.4	101	0.43	12	21	<0.28	<0.66	<0.50	<2
*Total	and Am	enable	Cyanio	de					
All wal	nes in	ma/ka	· ·						

All values in mg/kg

Samples BG-1 through BG-4 represent background composites for the 0 - 6", 6" - 12", 12" - 18" and 18" - 24" depth intervals respectively. The A, B, C and D postscript following sample locations B-1 and B-2 represent the same depth intervals respectively.

#### Data Evaluation

The analytical results obtained from the soil sampling within the past storage area were compared to the maximum contaminant standards established in the approved closure plan. The action level for VOCs were detection limits at a 1 mg/kg detection limit. VOC analysis revealed the presence of 1,1,1-Trichloroethane at concentrations of 0.06 and 0.09 mg/kg in samples B-1C and B-1D respectively, and the presence of tetrachloroethene at concentrations of 0.12 and 0.09 mg/kg in samples B2-C and B2-D respectively. These values are below the maximum contaminant standard of 1 mg/kg set forth in the closure plan.

The maximum contaminant standards for inorganic compounds, as established by the closure plan, are background levels plus three standard deviations. The background standard was established by calculating the standard deviation for each compound using the four sample depths as the population. The background standard for each depth was calculated by adding three times the standard deviation for the compound to the encountered value at each depth interval. These limits are summarized as follows:

times the standard deviation for barium from a study of background soil concentrations for similar soils in the Midwest is greater than the concentrations found at Ulrich's facility. Moreover, there is no indication that waste which is considered to be characteristically hazardous waste for barium (D 005) was ever stored at the unit according to the summary of the types of hazardous wastes stored at the facility found in Appendix A of the Closure Plan. For these reasons, and as stated in the correspondence from Ulrich to IDEM found in Appendix B, the unit has been determined to be unaffected by facility operations for barium.

Approximately one gallon of rinsate generated during the decontamination of the hand auger during this second round of sampling was released following completion of sampling activities. The rinsate was spilled on a grass covered area along the eastern portion of the past container storage area. Due to the low concentrations of contaminants encountered in the soil samples collected from this area, no adverse environmental impacts are anticipated from this spillage.

#### Current Storage Area

Closure of the current storage area consisted of pressure washing the concrete pad, collecting the generated rinsate and collecting representative samples of the rinsate. Each of these tasks are described below. The concrete pad was washed a total of three times. Appendix E contains photographs of the current storage pad.

#### Decontamination & Sampling Procedures

Prior to initiation of decontamination activities, the pad was inspected and determined to be free of cracks, gaps, holes, etc. The pad was then washed three times in an upstream to downstream direction. A hot water, high pressure washer was used to clean the pad, curbing and drain trough. All personnel within the work zone were equipped with Level C personal protection, including Tyvek coveralls and full face respirators equipped with combination organic vapor/HEPA cartridges.

Following each washing, the rinsate was collected using a wet/dry vacuum and placed in one 55 gallon D.O.T. approved drum. Following collection of the rinsate from all three washes, a sample of the rinsate was collected for laboratory analysis. The sample was placed on ice and transported to EIS accompanied by appropriate chain-of-custody documentation. The sample was analyzed for the parameters listed in Table 1.

#### Data Evaluation

Laboratory analysis revealed no detectable VOC levels at a

practical quantification limit of 10 ug/L (sample P-1). Total metals analysis revealed the presence of barium (0.35 mg/L), chromium (0.20 mg/L) and lead (0.36 mg/L) in the water sample (labeled as "plant yard" on the analytical report). The encountered concentrations were compared to the maximum contaminant standards as established in the closure plan. The standard for VOCs is detection limits, while the standard for inorganic compounds are the U.S. EPA drinking water standards. The drinking water standards are presented in Table 4.

Table 4
U.S. EPA Drinking Water Standards

Parameter	Standard	Parameter	Standard
Arsenic	0.05	Mercury	0.002
Barium	1.0	Selenium	0.01
Cadmium	0.01	Silver	0.05
Chromium	0.05	Cyanide (total)	0.2
Lead	0.05		

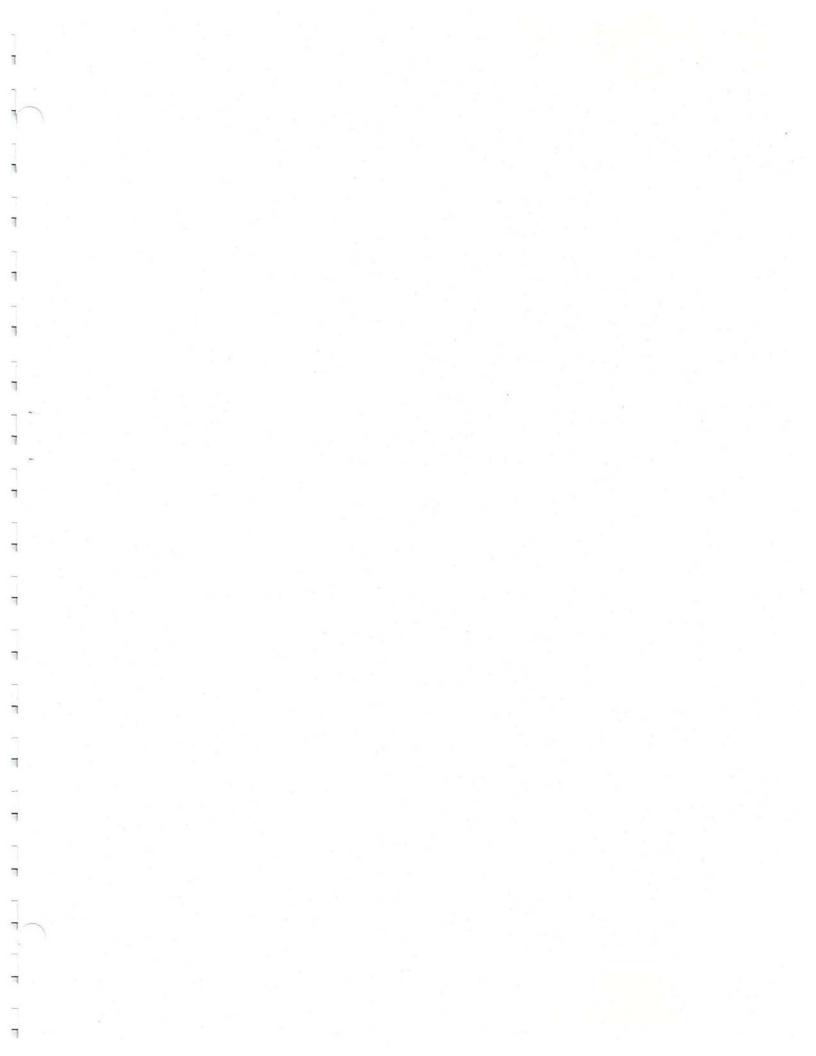
#### All values listed in mg/L

Comparison of the results and the drinking water standards revealed concentrations of total chromium and total lead above drinking water standards. In accordance with instructions in the closure plan, the concrete pad was washed a second time following the same methodology as previously used. Prior to washing the pad the second time, all painted walls, posts, etc. were covered with plastic sheeting. The rinsate was collected, placed in one 55-gallon drum and sampled as described above. The sample was delivered to NET for analysis for total chromium and total lead. Laboratory analysis revealed a total chromium concentration of 0.09 mg/L and a total lead concentration of 0.07 mg/L. The sample from this round was also inadvertently analyzed for barium, which revealed levels greater than drinking water standards. Since barium was found to be below drinking water standards during the first round of washing, the unit is considered clean for barium.

Although the chromium and lead concentrations in the rinsate had dropped from the previous washing, the concentrations remained above the drinking water standards. In accordance with the closure plan, the pad was washed a third time. Samples of the rinsate from the third washing were collected and returned to NET for chromium and lead analysis. Samples of the composite rinsate were collected as before and a sample of the rinsate from the final rinse was also collected. The analysis revealed total chromium concentrations of less than 0.03 mg/L in both samples and total lead concentrations of 0.12 mg/L in the composite sample and 0.06 mg/L in the final rinse sample. Complete laboratory results are provided in Appendix F.

characteristically hazardous waste streams for lead (D 008) and the majority of the waste streams stored at the facility were solvents.

Not withstanding the barium levels in the former storage unit and lead levels from the current storage unit discussed above. Ulrich has demonstrated that it has achieved a closure of these facilities within the meaning of the standards set forth in EPA's March 19, 1987 Federal Register Preamble. Although the concentrations of barium in the soil and lead in the rinsate imply that some hazardous constituents may remain at the site following closure, their presence is believed to represent an insignificant threat to human health and the environment under normal operating conditions by Ulrich. This approach is consistent with the interpretation of the terms "remove and decontaminate" as provided by the US EPA in the March 19, 1987 Federal Register which "recognizes that at certain sites limited quantities of hazardous constituents might remain in the subsoil yet present only insignificant risks to human health and the environment." In light of this interpretation and its applicability in this case, Hoosier provides the certification of final closure in Appendix H.





#### ANALYTICAL REPORT NON

#### NON-ORGANIC PARAMETERS

Mr. Mike Casper, Hoosier Environmental Services

REPORT TO: 550 Congressional Blvd., Suite 240, Carmel, IN 46032

BILL TO: Hoosier Environmental Services

EIS LAB NUMBER:

3078 - 3090

EIS PROJECT NO:

CLIENT P.O. NO:

DATE SAMPLED:

5-23-89

DATE RECEIVED:

5-25-89

REPORT FORWARDED: 6-29-89 & 7-17-89

SAMPLE IDENTIFICATION:

Project Number 89059

Ulrich Chemical

Sample			- Conc	entrat	ion (m	ig/kg - a	s recei	ved) -		
Descrip-									Cyani	ide
tion_	As	Ba	Cd	Cr	Pb	Hg	Se	Ag	Total	
BG-1	3.0	72	0.30	12	27	<0.30	<0.60	<0.50	<2	<2
BG-2	4.0	74	0.24	16	28	<0.30	<0.70	<0.50	< 2	<2
BG-3	4.2	104	0.25	16	31	<0.28	<0.67	<0.50	< 3	<3
BG-4	3.1	99	0.16	16	27	<0.28	<0.60	<0.50	<2	<2
B1-A	<0.5	22	0.44	8.0	6.5	<0.28	<0.67	<0.50	< 2	<2
B1-B	1.4	61	0.38	9.8	15	<0.28	<0.69	<0.50	<2	<2
B1-C	3.0	105	0.29	19	29	<0.28	<0.64	<0.50	<2	<2
B1-D	2.8	133	0.23	18	28	<0.28	<0.71	<0.50	<1	<1
B2-A	2.9	111	0.36	16	26	<0.28	<0.65	<0.50	<2	<2
B2-B	2.2	90	0.38	17	23	<0.28	<0.67	<0.50	<2	<2
B2-C	4.0	163	0.40	16	28	<0.28	<0.66	<0.50	<2	<2
B2-D	2.4	101	0.43	12	21	<0.28	<0.66	<0.50	<2	<2
Plant										12
Yard*	<0.01	0.35	<0.02	0.20	0.36	<0.001	<0.01	<0.02	<0.5	<0.5

\* Values in mg/l

#### Notes

- 1. VOC report is enclosed.
- Chain-of-custody document is enclosed.
- 3. Quality Assurance is summarized in Table 1 attached.

Andri Porte



#### ANALYTICAL REPORT

#### VOLATILE ORGANIC COMPOUNDS

Mr. Mike Casper, Hoosier Environmental Services

REPORT TO: 550 Congressional Blvd., Suite 240, Carmel, IN 46032

Hoosier Environmental Services

EIS LAB NUMBER:

3082 - 3089

EIS PROJECT NO:

CLIENT P.O. NO:

5-23-89 DATE SAMPLED:

DATE RECEIVED:

5-25-89

REPORT FORWARDED:

7-14-89

SAMPLE IDENTIFICATION:

Project 89059

Ulrich Chemical

Table 1A presents results of analysis.

SAMPLE RESULTS WILL LIST ONLY THOSE COMPOUNDS WHICH ARE ACTUALLY DETECTED IN THE SAMPLE. If no compounds of the types described in Table 3 are detected, the following statement is given:

"No Table 3 Volatile Organic Compounds (VOC) were detected in this sample."

- Table 2 summarizes test procedures used.
- Table 3 lists the types of compounds which can be detected by the test procedures employed.
- Additional data which might accompany this report includes chromatograms, Quality Assurance data sheets, Chain-of-Custody forms and allowable contaminant limits (if available). data is analysis support documentation.
- The following support documentation is enclosed.
  - Chromatograms of GC/Hall/PID Analysis
  - Surrogate Recovery Data
  - Daily Check Standard Analysis
  - Duplicate Matrix Spike Analysis

#### ANALYTICAL REPORT STRUCTURE

#### Table 3

Compounds shown in Table 3 are those currently called either Priority Pollutants or Target Compound List (TCL) species. These are listed in alphabetical order.

The terminology "Partial Listing" in the title of Table 3 refers to the fact that the Purge and Trap method is capable of detecting numerous volatile organic compounds which are not Priority Pollutants or TCL species at this time. This includes fuel hydrocarbons.

Compounds in Table 3, if detected in the sample(s), are reported by name in Table 1A. If no Table 3 compounds are detected, a statement to this effect is given.

#### Table 1A

Results presented in Table 1A list only those Table 3 Volatile Organic Compounds which were detected in one or more of the samples.

In addition to reporting concentrations of Table 3 compounds found (or not detected statements), a PQL value is also given. The term PQL refers to Practical Quantitation Limit. The value associated with the PQL is expressed as a "multiplier", i.e. X 10.

This multiplier is used in conjunction with the compound specific PQL concentrations provided in Table 3. The multiplier is <a href="mailto:employed only for those compounds which are Not Detected">employed only for those compounds which are Not Detected</a>. Multiplying the Table 3 PQL value by the indicated multiplier provides the Detection Limit for non-detected compounds.

The Detection Limit changes with sample preparation requirements (i.e., dilutions). Two separate samples may have entirely different Detection Limits.

To use the multiplier, enter the correct column in Table 3 based on sample type (water or soil) and method used (i.e., 601 + 602/8240). Multiply the PQL concentration shown (either in  $\mu$ g/l or ppm) by the multiplier. The resulting value is the Detection Limit for that compound in that sample.

The PQL multiplier is not applicable to fuel hydrocarbon residuals.

#### TABLE 1A SAMPLE ANALYSIS RESULTS - VOC

CLIENT DESCRIPTION _	Project 8	9059 - Ulrich Chemical	
SAMPLE TYPE	Soils	ANALYTICAL METHOD	8010 + 8020
DATE ANALYZED	6-29-89	SAMPLE RECEIVED COLD	Yes

	Concentration (mg/kg - as received)								
Parameter	B1-A	B1-B	B1-C	B1-D	B2-A	B2-B	B2-C	_B2-D_	
1,1,1-Trichloroethane	ND	ND	0.06	0.09	ND	ND	ND	ND	
Tetrachloroethene	[0.04]	[0.03]	[0.02]	[0.03]	[0.04]	[0.03]	0.12	0.09	
PQL	X 1	X 1	X 1	X 1	X 1	X 1	X 1	X 1	
Dilution Used	None	None	None	None	None	None	None	None	
Fuel Hydrocarbons	ND	ND	ND	[2.8]	ND	ND	ND	ND	
% Moisture	4.0	8.1	19.2	20.9	13.2	17.6	19.1	16.8	

#### Notes:

- 1. Concentration ND = Not Detected.
- Concentration [] = Detected but below PQL at the estimated level shown.
- Fuel hydrocarbon is quantitated as #2 fuel oil for these samples, the Practical Quantitation Limit (PQL) for fuel hydrocarbons was 5 mg/kg.
- A PQL = X 1 is essentially equal to a "Detection Limit" of 0.05 mg/kg for the majority of Table 3 VOC.
- These sample were extracted on 6-01-89.

2008 Revised (05-09-89)

#### TABLE 1A SAMPLE ANALYSIS RESULTS - VOC

CLIENT DESCRIPTION _	Project 89	9059 - Ulrich Chemical - P1
SAMPLE TYPE	Water	ANALYTICAL METHOD 601 + 602
DATE ANALYZED	6-12-89	SAMPLE RECEIVED COLDYes

O No individual Table 3 Volatile Organic Compounds were found in sample P1 at a PQL = X 10.

This PQL value is essentially equal to a "Detection Limit" of 10  $\mu \rm g/l$  for the majority of Table 3 compounds.

No fuel hydrocarbons were detected in this sample. Expressed as #2 fuel oil, the "Detection Limit" for fuel hydrocarbons was 1000  $\mu g/1$ .

2008 Revised (05-09-89)

#### TABLE 2

## REFERENCE METHODS/ANALYTICAL PROCEDURES VOLATILE ORGANIC COMPOUNDS

#### REFERENCES

- "Test Methods: Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater", USEPA-600/4-82-057, July 1982, Methods 601, 602, 624
- "Test Methods for Evaluating Solid Waste: Physical/Chemical Methods", SW-846, Third Edition, November 1986, Methods 8010, 8020, 8240

#### ANALYTICAL PROCEDURES

VOC of interest are liberated from the matrix by use of Purge and Trap procedures. Surrogate compounds are employed for each Purge and Trap run. The effluent from the gas chromatograph is monitored by either Hall Electrolytic Conductivity and Photoionization detectors operating in series or by a Mass Spectrometer.

Method blanks and analytical check standards are analyzed with each days run for Volatile Organic Compounds. In addition, if analysis is by Mass Spectrometry, the tuning compound BFB must meet abundance criteria prior to proceeding with analysis.

Water samples utilize 600 series method numbers (Reference 1) while soil/solid waste samples are analyzed by 8000 series method numbers (Reference 2). The following is applicable.

Sample_Type	Hall Conductivity Photoionization _ (GC/Hall/PID) _	Mass Spectrometry _ (GC/MS) _		
Water	601 + 602	624		
Soil/Solid Waste	8010 + 8020	8240		

#### SUPPORTING DATA

If GC tracings or GC/MS data is supplied with this report, surrogate/internal standards are identified by the letters (S) and (IS).

TABLE 3

PARTIAL LISTING - VOLATILE ORGANIC COMPOUNDS

DETECTABLE BY PROCEDURES LISTED IN TABLE 2

AND PRACTICAL QUANTITATION LIMITS (PQL)

Practical Quantitation Limits (PQL) Water (µg/l) Soils (ppm) Compound Name 601 + 602624 8010+8020 8240 Acetone 100  $\overline{100}$ 5.0 5.0 Acrolein 100 5.0 Acrylonitrile 100 5.0 Benzene 1 5 0.05 0.25 5 Bromobenzene 1 0.05 0.25 5 Bromochloromethane 1 0.05 0.25 Bromoethane 1 5 0.05 0.25 Bromodichloromethane 5 1 0.05 0.25 5 Bromoform 10 0.5 0.25 5 Bromomethane 10 0.5 0.25 n-Butyl Benzene 1 5 0.25 0.05 Sec-Butyl Benzene 1 5 0.05 0.25 5 tert-Butyl Benzene 1 0.25 0.05 Carbon Disulfide 5 0.25 Carbon Tetrachloride 1 5 0.05 0.25 Chlorobenzene 1 5 0.05 0.25 Chlorodibromomethane 1 5 0.05 0.25 Chloroethane 1 10 0.05 0.5 2-Chloroethylvinyl Ether 10 5 0.5 0.25 Chloroform 1 5 0.05 0.25 1-Chlorohexane 1 5 0.05 0.25 Chloromethane 1 10 0.05 0.5 2-Chlorotoluene 1 5 0.05 0.25 5 4-Chlorotoluene 1 0.05 0.25 5 1,2-Dibromo-3-chloropropane 30 1.5 0.25 5 1,2-Dibromoethane 10 0.5 0.25 5 c-1,2-Dibromoethylene 1 0.05 0.25 5 t-1,2-Dibromoethylene 1 0.05 0.25 Dibromomethane 20 5 1.0 0.25 5 1,2-Dichlorobenzene 1 0.05 0.25 1,3-Dichlorobenzene 5 1 0.05 0.25 5 1,4-Dichlorobenzene 1 0.05 0.25 1,4-Dichloro-2-butane Dichlorodifluoromethane 1 5 0.05 0.25 1,1-Dichloroethane 5 1 0.05 0.25 1,2-Dichloroethane 5 0.05 1 0.25 1,1-Dichloroethene 5 1 0.05 0.25 5 c-1,2-Dichloroethene 1 0.05 0.25 t-1,2-Dichloroethene 1 5 0.25 0.05 1,2-Dichloropropane 1 5 0.05 0.25 1,3-Dichloropropane 5 0.25 2,2-Dichloropropane 5 0.25 1,1-Dichloropropene 0.25 c-1,2-Dichloropropene 1 5 0.25 0.05 t-1,2-Dichloropropene 5 1 0.05 0.25 Diethyl Ether 100 100 5.0 5.0 Ethylbenzene 1 5 0.05 0.25 Ethyl Methacrylate

# TABLE 3 - Continued PARTIAL LISTING - VOLATILE ORGANIC COMPOUNDS DETECTABLE BY PROCEDURES LISTED IN TABLE 2 AND PRACTICAL QUANTITATION LIMITS (PQL)

Nature (ug/1)   Soils (ppm)		Practical Quantitation				
Name						
Hexachlorobutadiene   1	Compound Name	601 + 602	624	8010+8020	8240	
Hexachlorobutadiene   1						
2-Hexanone		<u>-</u>	-			
Isopropyl Benzene (Cumene)						
Isopropyl Benzene (Cumene)   1						
Methyl Ethyl Ketone       10       10       0.5       0.5         Methyl Isobutyl Ketone       10       10       0.5       0.5         Methyl Methacrylate       -       -       -         Naphthalene       1       10       0.05       0.5         Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         Trichlorofluoromethan			5			
Methyl Ethyl Ketone       10       10       0.5       0.5         Methyl Isobutyl Ketone       10       10       0.5       0.5         Methyl Methacrylate       -       -       -         Naphthalene       1       10       0.05       0.5         Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         Trichlorofluoromethan		1	5			
Methyl Ethyl Ketone       10       10       0.5       0.5         Methyl Isobutyl Ketone       10       10       0.5       0.5         Methyl Methacrylate       -       -       -         Naphthalene       1       10       0.05       0.5         Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         Trichlorofluoromethan			5			
Methyl Isobutyl Ketone       10       10       0.5       0.5         Methyl Methacrylate       -       -       -         Naphthalene       1       10       0.05       0.5         Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5       0.25         Toluene       1       5       0.05       0.25       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25 <t< td=""><td></td><td></td><td></td><td></td><td></td></t<>						
Methyl Methacrylate       -       -       -       -       -       -       -       -       -       5.0       0.5       Nitrobenzene       -       -       100       -       5.0       0.5       0.5       0.25       0.05       0.25       0.25       0.25       0.05       0.25       0.25       0.25       0.25						
Naphthalene       1       10       0.05       0.5         Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25		10	10	0.5	0.5	
Nitrobenzene       -       100       -       5.0         Paraldehyde       -       100       -       5.0         n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       0.5       0.5       0.5 <td></td> <td><u>-</u></td> <td>1000</td> <td>-</td> <td></td>		<u>-</u>	1000	-		
Paraldehyde         -         100         -         5.0           n-Propyl Benzene         1         5         0.05         0.25           Styrene         1         5         0.05         0.25           1,1,1,2-Tetrachloroethane         1         5         0.05         0.25           Tetrachloroethylene         1         5         0.05         0.25           Tetrachloroethylene         1         5         0.05         0.25           Tetrahydrofuran         10         10         0.5         0.5           Toluene         1         5         0.05         0.25           1,2,3-Trichlorobenzene         1         5         0.05         0.25           1,2,4-Trichloroethane         1         5         0.05         0.25           1,1,2-Trichloroethane         1         5         0.05         0.25           Trichlorofluoromethane         1         5         0.05         0.25           Trichlorofluoromethane         1         5         0.05         0.25           1,2,3-Trichlorotrifluoroethane         1         5         0.05         0.25           1,2,4-Trimethylbenzene         1         5         0.05         0.		1		0.05		
n-Propyl Benzene       1       5       0.05       0.25         Styrene       1       5       0.05       0.25         1,1,1,2-Tetrachloroethane       1       5       0.05       0.25         1,1,2,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichloroebenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.05       0.25         1,2,3-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5<		=		-		
Styrene       1       5       0.05       0.25         1,1,1,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       10       0.5       0.5	Paraldehyde			-	5.0	
Styrene       1       5       0.05       0.25         1,1,1,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichlorotrifluoroethane       1       5       0.05       0.25         1,1,2-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       0.5       0.5       0.5	n-Propyl Benzene	1	5	0.05	0.25	
1,1,2,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,1,2-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       10       0.5       0.5	Styrene	1	5	0.05	0.25	
1,1,2,2-Tetrachloroethane       1       5       0.05       0.25         Tetrachloroethylene       1       5       0.05       0.25         Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,1,2-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       10       0.5       0.5						
Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,1,2-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       10       0.5       0.5		1	5	0.05	0.25	
Tetrahydrofuran       10       10       0.5       0.5         Toluene       1       5       0.05       0.25         1,2,3-Trichlorobenzene       1       5       0.05       0.25         1,2,4-Trichlorobenzene       1       5       0.05       0.25         1,1,1-Trichloroethane       1       5       0.05       0.25         1,1,2-Trichloroethane       1       5       0.05       0.25         Trichlorofluoromethane       1       5       0.05       0.25         1,2,3-Trichloropropane       5       5       0.5       0.25         1,1,2-Trichlorotrifluoroethane       1       5       0.05       0.25         1,2,4-Trimethylbenzene       1       5       0.05       0.25         1,3,5-Trimethylbenzene (Mesitylene)       1       5       0.05       0.25         Vinyl Acetate       10       10       0.5       0.5		1	5	0.05	0.25	
Toluene 1 5 0.05 0.25 1,2,3-Trichlorobenzene 1 5 0.05 0.25 1,2,4-Trichlorobenzene 1 5 0.05 0.25 1,1,1-Trichloroethane 1 5 0.05 0.25 1,1,2-Trichloroethane 1 5 0.05 0.25 Trichloroethylene 1 5 0.05 0.25 Trichlorofluoromethane 1 5 0.05 0.25 1,2,3-Trichloropropane 5 0.5 0.25 1,1,2-Trichlorotrifluoroethane 1 5 0.05 0.25 1,2,4-Trimethylbenzene 1 5 0.05 0.25 1,3,5-Trimethylbenzene (Mesitylene) 1 5 0.05 0.25 0.25 0.25 0.25 0.25 0.25 0.		10	10	0.5	0.5	
Vinyl Acetate 10 10 0.5 0.5		1	5			
Vinyl Acetate 10 10 0.5 0.5	1,2,3-Trichlorobenzene		5	0.05		
Vinyl Acetate 10 10 0.5 0.5	1,2,4-Trichlorobenzene		5			
Vinyl Acetate 10 10 0.5 0.5		1	5	0.05		
Vinyl Acetate 10 10 0.5 0.5	1,1,2-Trichloroethane	1	5	0.05		
Vinyl Acetate 10 10 0.5 0.5	Trichloroethylene	1	5	0.05		
Vinyl Acetate 10 10 0.5 0.5	Trichlorofluoromethane	1	5	0.05	0.25	
Vinyl Acetate 10 10 0.5 0.5	1,2,3-Trichloropropane	5	5	0.5	0.25	
Vinyl Acetate 10 10 0.5 0.5	1,1,2-Trichlorotrifluoroethane	1	5	0.05	0.25	
Vinyl Acetate 10 10 0.5 0.5	1,2,4-Trimethylbenzene	1	5	0.05	0.25	
Vinyl Acetate 10 10 0.5 0.5		1	5	0.05	0.25	
		10	10	0.5	0.5	
1 5 0.05 0.25						
m + p-xylenes 1 0.00 0.20	m + p-Xylenes	1	5	0.05	0.25	
o-Xylene 1 5 0.05 0.25		1	5	0.05	0.25	

#### Notes

- Compounds with "-" in PQL columns cannot be determined by the method shown.
- Fuel type hydrocarbons such as gasoline, fuel oil, kerosene and industrial mixtures such as naphtha and thinners are also detected by these procedures.
- Soil PQL is on an "as received basis". Both water and soil PQL values are for CLEAN samples. PQL increases with sample matrix problems.
- 4. Water sample PQL is based on purging 5 ml of sample.

#### EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS

QC Description: Surrogate Recovery EIS Lab Numbers: 3082 - 3089

Date Analyzed: 6-28-89

			REC	OVERY DAT	ra *		
Client Sample	Me	thod 601-	+602/801	0+8020	Method	624/8240	
Description	S1	_S2_	_ S 3	<u>S4</u>		<u>S2</u>	
B1-A	99	107	84	88			
B1-B	99	107	83	82			
B1-C	99	106	88	9.3			
B1-D	99	106	83	83			
B2-A	100	103	86	91			
B2-B	102	107	84	84			
B2-C	101	113	85	90			
B2-D	103	117	87	92			

#### SURROGATE COMPOUND DESCRIPTIONS AND QUALITY CONTROL LIMITS

Compound #	METHODS 601+602/8010+8020 Compound Name	QC Limits
S1	1-Bromo-2-chloroethane	70 - 130
S2	1,4-Dichlorobutane	70 - 130
S3	Toluene, d6	70 - 130
S 4	1,9-Decadiene	70 - 130
	METHODS 624/8240	
Compound #	Compound Name	QC Limits
S1	1,2-Dichloroethane,d4	70 - 130
S2	Toluene, d6	70 - 130
S3	Bromofluorobenzene	70 - 130

2017 Rev (12-01-88)

#### EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS

QC Description: Check Standard
Client Sample Group: Project 89059
EIS Lab Numbers: 3082 - 3089
nate Analyzed: 6-28-89

Analysis Method: 8010 + 8020 Concentration Units: µg/l

#### SURROGATE RESPONSES

EPA Methods 601 + 602				
% Rec	Compound			
96	1,2-Dichloroe			
98	Toluene, d6			
108	Bromofluorobe			
100				
	% Rec 96 98 108			

EPA Method 624		QA/QC
Compound Name 2-Dichloroethane,d4 cluene,d6 comofluorobenzene	% Rec	Limits 70-130 70-130 70-130 70-130

#### SAMPLE RESULTS

	SAMPLE RESULTS				(01 B		(00)
•	Parameter	<u>Concent</u> <u>True</u>	Found	Recovery %	624 Respor Initial	Found	% DIF
	Acetone	56.8	56.1	99			
	Acrolein						
	Acrylonitrile						
	Benzene	10.2	11.6	114			
	Bromobenzene						
	Bromochloromethane						
	Bromodichloromethane						
	Bromoethane						
	Bromoform **	14.7	12.1	82	0.182		
	Bromomethane						
	n-Butyl Benzene						
	Sec-Butyl Benzene						
	tert-Butyl Benzene						
	Carbon Disulfide						
	Carbon Tetrachloride	9.0	7.3	81			
	Chlorobenzene **	11.6	10.1	87	0.952		
	Chlorodibromomethane	10.7	9.6	90			
	Chloroethane						
	2-Chloroethylvinylether						
	Chloroform *	9.5	8.9	94	1.093		
	1-Chlorohexane						
	Chloromethane **				0.362		
	2-Chlorotoluene				0.000		
	4-Chlorotoluene						
	Cyclohexanone						
	1,2-Dibromo-3-chloropropane						
	1,2-Dibromoethane						
	c-1,2-Dibromoethylene						
	t-1,2-Dibromoethylene						
_	Dibromomethane						
	1,2-Dichlorobenzene	12.0	10.4	87			
	1,3-Dichlorobenzene	12.0	10.4	07			
	1,4-Dichlorobenzene	17.8	15.5	87			
	1,4-Dichiologenzene	17.0	10.0	07			

3008 Rev (07-11-89)

# EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS Check Standard Continuation

Parameter	Concent True	ration Found	Recovery 	624 Response Factors (RF) Initial Found % DIF
1,4-Dichloro-2-butane				
Dichlorodifluoromethane				
1,1-Dichloroethane **	9.1	7.0	77	1.034
_ 1,2-Dichloroethane	10.7	8.7	81	1.034
1,1-Dichloroethene *	10.7	0.7	01	0.003
c-1,2-Dichloroethene	10.0	8.4	84	0.902
t-1,2-Dichloroethene	10.0	0.4	84	
1,2-Dichloropropane *	10.0	0.0	00	0.030
1,3-Dichloropropane	10.0	9.0	90	0.279
2,2-Dichloropropane				
1,1-Dichloropropene				
c-1,2-Dichloropropene				
t-1,2-Dichloropropene				
Diethyl Ether	2.2			
Ethylbenzene *	10.4	12.0	115	2.213
Ethyl Methacrylate				
Fluorotrichloromethane				
* n-Heptane				
Hexachlorobutadiene				
2-Hexanone	42.3	35.5	84	
Iodomethane				
Isopropyl Benzene				
p-Isopropyl Toluene				ė.
Methylene Chloride	10.2	9.1	89	
Methyl Ethyl Ketone				
Methyl Isobutyl Ketone	38.0	32.6	86	
Methyl Methacrylate				
Naphthalene				
Nitrobenzene				
Paraldehyde				
n-Propyl Benzene				
Styrene	11.4	12.7	111	
1,1,1,2-Tetrachloroethane			111	
1,1,2,2-Tetrachloroethane**				0.583
Tetrachloroethylene	9.7	8.6	87	0.505
Tetrahydrofuran	71.8	66.6	93	
Toluene *	10.8	12.3	114	1.497
1,2,3-Trichlorobenzene	20.0	12.5	114	1.497
1,2,4-Trichlorobenzene				
1,1,1-Trichloroethane	9.0	7.8	87	
1,1,2-Trichloroethane	11.1	9.2		
Trichloroethylene	10.0	9.1	83	
Trichlorofluoromethane	10.0	9.1	91	
1,2,3-Trichloropropane				
1,1,2-Trichlorotrifluoroethane				
1,2,4-Trimethylbenzene				
1,3,5-Trimethylbenzene				
Vinyl Acetate				
Vinyl Chloride *				
	10 5		100	0.383
h + p-Xylenes	10.5	11.4	109	
o-Xylene	10.2	12.3	121	
2000				
3008 Rev (07-11-89)				

Rev (07-11-89)

#### EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS Check Standard Continuation

### QA/QC Interpretation

- $\star$  Calibration Check Compound (CCC) with maximum % DIF = 25%
- \*\* System Performance Check Compound (SPCC) with minimum RF = 0.3 (0.25 for Bromoform)

3008 Rev (07-11-89)

#### EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS

QC Description: Duplicate Matrix Spike Client Sample Group: Project 89059
EIS Lab Numbers: 3082 - 3089
Date Analyzed: 6-28-89

Matrix: EIS #3051

Analysis Method: 8010 + 8020 Concentration Units: mg/kg

#### SURROGATE RESPONSES

EPA Methods 601 + 602		EPA Method 624				
% Rec	Compound Name	% Rec	Limits			
$1\overline{09/10}9$	1,2-Dichloroethane,d4	X <del></del>	70-130			
122/120	Toluene, d6		70-130			
91/89	Bromofluorobenzene		70-130			
96/95			70-130			
	% Rec 109/109 122/120 91/89	% Rec Compound Name 109/109 1,2-Dichloroethane,d4 122/120 Toluene,d6 91/89 Bromofluorobenzene	% Rec Compound Name % Rec 109/109 1,2-Dichloroethane,d4 122/120 Toluene,d6 91/89 Bromofluorobenzene			

#### SAMPLE RESULTS

Parameter	Spike	Back-	Amount	Recovered	Recovery Data	
	Level	ground	#1	#2	%R	RPD
Acetone						
Acrolein						
Acrylonitrile		No Experim	2007 1100	2 2		<b>~</b> 2
Benzene	1.3	ND	1.0	1.0	77	0
Bromobenzene						
Bromochloromethane						
Bromoethane						
Bromoform						
Bromodichloromethane						
Bromomethane						
Carbon Disulfide			100			
Carbon Tetrachloride						
Chlorobenzene						
Chlorodibromomethane						
Chloroethane						
2-Chloroethylvinylether						
Chloroform	0.68	ND	0.63	0.67	96	6
1-Chlorohexane						
Chloromethane						
2-Chlorotoluene						
4-Chlorotoluene						
Cumene						
1,2-Dibromo-3-chloropropane						
1,2-Dibromoethane						
c-1,2-Dibromoethylene						
t-1,2-Dibromoethylene						
Dibromomethane						
1,2-Dichlorobenzene						
1,2-Dichiologenzene						

3009 Rev (12-29-88)

#### EIS ENVIRONMENTAL ENGINEERS, INC. QUALITY ASSURANCE DATA SHEET VOLATILE ORGANIC COMPOUNDS Duplicate Matrix Spike Continuation

3		Duplicate Matrix Spike Continuation								
		Spike	Back-	Amount Recovered		Recovery Data				
1	Parameter	Level	ground	#1	#2	%R	RPD			
		_ Bever	ground			7011	_KID			
1	1,3-Dichlorobenzene									
1	1,4-Dichlorobenzene									
	1,4-Dichloro-2-butane									
1	Dichlorodifluoromethane									
1	1,1-Dichloroethane									
1	1,2-Dichloroethane	0.39	ND	0.44	0.47	117	7			
	1,1-Dichloroethene	0.37	ND	0.44	0.47	117				
1	c-1,2-Dichloroethene									
	t-1,2-Dichloroethene	0.33	ND	0.34	0.42	115	21			
		0.33	ND	0.34	0.42	כננ	21			
	1,2-Dichloropropane									
	1-3, Dichloropropane									
1	2,2-Dichloropropane									
	c-1,2-Dichloropropene t-1,2-Dichloropropene									
1										
	Diethyl Ether	1.1	MID	0.94	0.05	07	•			
	Ethylbenzene	1.1	ND	0.94	0.95	86	1			
	Ethyl Methacrylate									
	n-Heptane Hexachlorobutadiene									
	2-Hexanone									
7	Iodomethane									
	Methylene Chloride									
	Methyl Ethyl Ketone									
	Methyl Isobutyl Ketone									
	Methyl Methacrylate									
	Naphthalene Nitrobenzene									
	Paraldehyde									
1	Styrene									
9	1,1,2,2-Tetrachloroethane									
	Tetrachloroethylene									
	Tetrahydrofuran Toluene									
	1,2,3-Trichlorobenzene									
1	1,2,4-Trichlorobenzene									
	1,1,1-Trichloroethane 1,1,2-Trichloroethane	0.45	ND	0 /1	0 /2	0.2	-			
1		0.45	ND	0.41	0.43	93	5			
2	Trichloroethylene									
1	Trichlorofluoromethane									
1	1,2,3-Trichloropropane									
	1,1,2-Trichlorotri-									
1	fluoroethane									
	1,2,4-Trimethylbenzene									
1	1,3,5-Trimethylbenzene	1 0	ND	1 7	1 7	00	0			
	Vinyl Acetate	1.9	ND	1.7	1.7	89	0			
1	Vinyl Chloride									
-	m + p-Xylenes									
	p-Xylene									
1	3009									

3009 Rev (12-29-88)

Real Time Chromatogram of 3082 1/50 ULR. BIA From 0 min To 40 min. Channel A: PID Channel B: HECD Range = 4 mV Offset = 2.741 mV Range = 65 mV Offset = -2.126 mV 210 HALL 10.0 w Hethow Blank L HetuoD Blank 20,0

Canala Nana 7002 1/50 H.D. DIA

Sample Name 3082 1/50 ULR. BIA

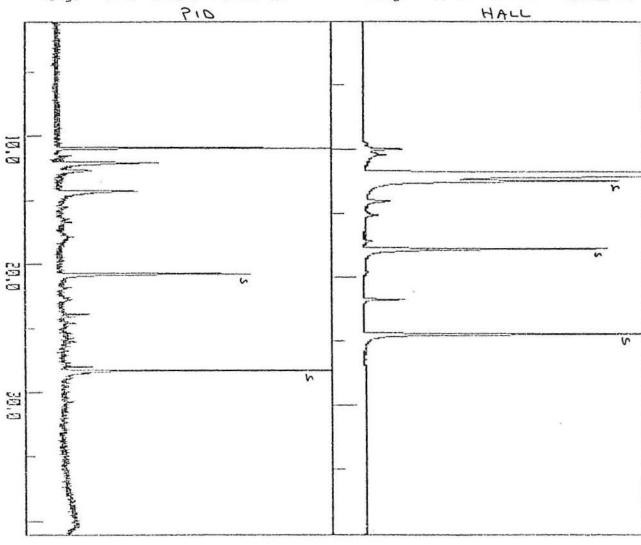
DUNE NOTE: The Date Hand Comment of the Carporate State of the Carpo

NOTE: The Data Was Stored In File 9179P123: ,700.0,1

Real Time Chromatogram of 3083 1/50 ULR. BIB From 0 min To 40 min Channel A: PID Channel B: HECD

Range = 4 mV Offset = 2.727 mV

Channel B: HECD Range = 65 mV Offset = -2.125 mV



Sample Name 3083 1/50 ULR. B1B

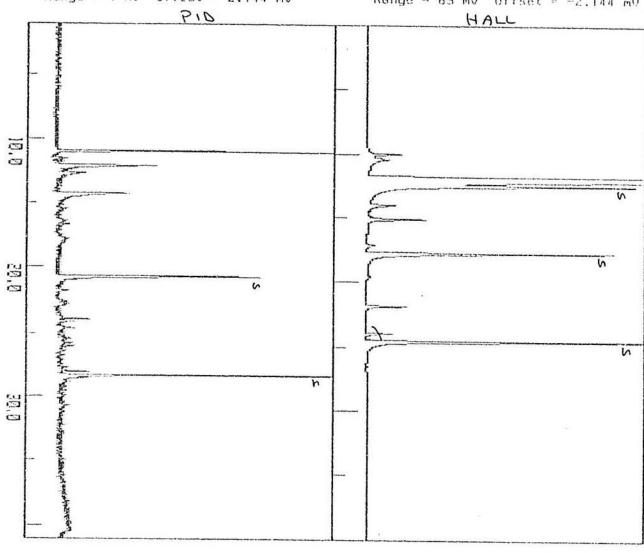
NOTE: The Data Was Stored In File 9179PI24:,700.0,1

Real Time Chromatogram of 3084 1/50 ULR. BI-C From 0 min To 40 min Channel A: PID

Range = 4 mV Offset = 2.744 mV

Channel B: HECD

Range = 65 mV Offset = -2.144 mV



Sample Name 3084 1/50 ULR. B1-C

Date: 29 Jun 1989 06:43 Interface: 706

Method: 090P1Dm Cycle#: 25 Channel#: A

Operator: BLC

Vial#: -1

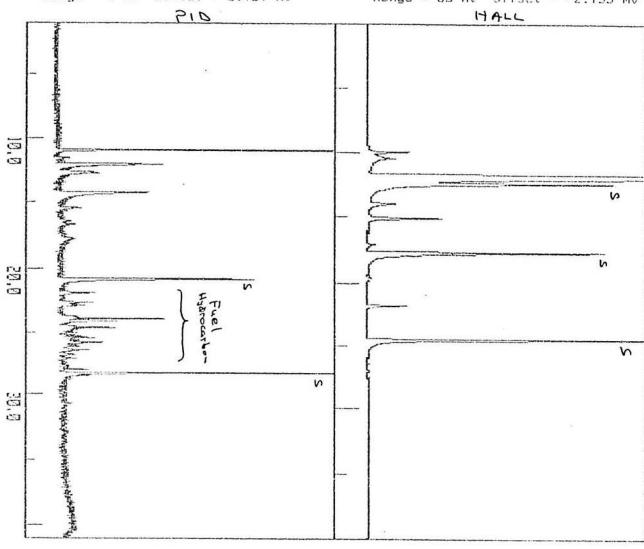
NOTE: The Data Was Stored In File 9179PI25:,700,0,1

Real Time Chromatogram of 3085 1/50 ULR. B1-D From 0 min To 40 min

Channel A: PID

Range = 4 mV Offset = 2.727 mV

Channel B: HECD Range = 65 mV Offset = -2.133 mV



Sample Name 3085 1/50 ULR. B1-D

Date: 29 Jun 1989 07:33 Interface: 706

Cycle#: 26

Method: 090FIDm

Channel#: A

Operator: BLt

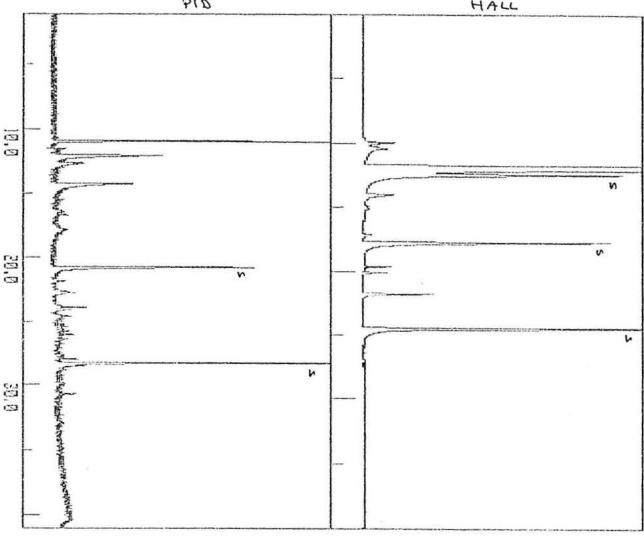
Vial#: -!

NOTE: The Data Was Stored In File 9179PI26:,700,0,1

Real Time Chromatogram of 3086 1/50 ULR. <u>B2-A</u> From 0 min To 40 min Channel A: PID Channel B: HECD

Range = 4 mV Offset = 2.751 mV Range = 65 mV Offset = -2.136 mV

PID HALL



ASTERDARISHMEN PRODUCTION OF A LOS AND DO A

Sample Name 3086 1/50 ULR. B2-A

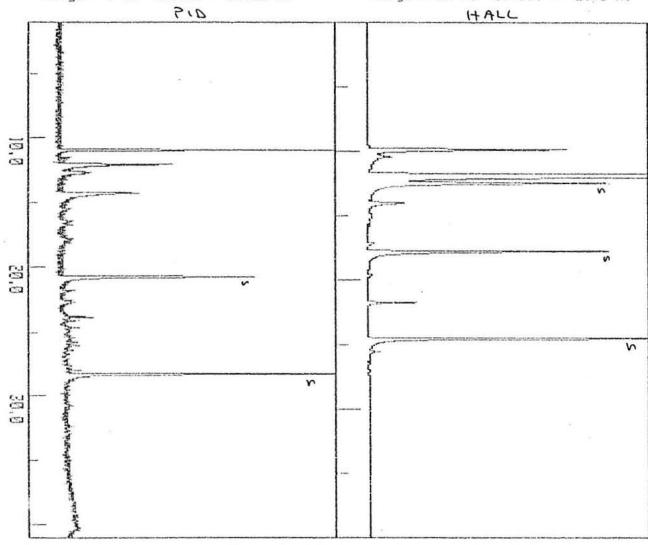
- NOTE: The Data Was Stored In File 9179PI27: ,700,0,1

Real Time Chromatogram of 3087 1/50 ULR. B2-B From 0 min To 40 min Channel B: HECD

Channel A: PID

Range = 4 mV Offset = 2.733 mV

Range = 65 mV Offset = -2.13 mV



Sample Name 3087 1/50 ULR. 82-B

Date: 29 Jun 1989 09:12 Method: 090PIOm Operator: BLC Cycle#: 28 Channel#: A Vial#: -1 Interface: 706

NOTE: The Data Was Stored In File 9179P128: ,700,0,1

Real Time Chromatogram of 3088 1/50 ULR. B2-C From 0 min To 40 min Channel A: PID Channel B: HECD Range = 4 mV Offset = 2.733 mV Range = 65 mV Offset = -2.138 mV 910 HALL 10. B 9,85 Tetraculopoeturu & Tetrachlosostueus

ADDUCTOR OF THE PROPERTY OF TH

Sample Name 3088 1/50 ULR. B2-C

Date: 29 Jun 1989 10:13 Method: 090PIDm

Interface: 705

Cycle#: 29

Operator: BLC Channel#: A

Vial#: -1

NOTE: The Data Was Stored In File 9179PI29: ,700,0.1

Real Time Chromatogram of 3089 1/50 ULR. B2-D From 0 min To 40 min Channel B: HECD Channel A: PID Range = 4 mV Offset = 2.718 mV Range = 65 mV Offset = -2.131 mV 210 HALL 10.0 9,62 Tetrachloroethene - Tetraculopoetime H

Sample Name 3089 1/50 ULR. B2-D

Date: 29 Jun 1989 11:17 Method: 090PIDm Interface: 705

Cycle#: 30

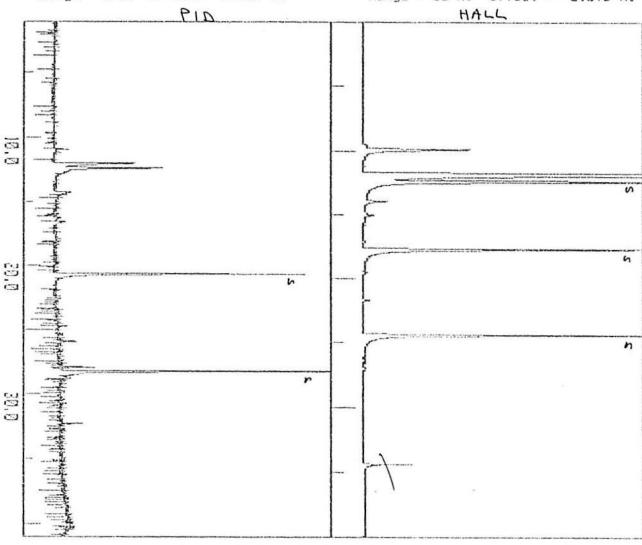
Operator: BLC

Vial#: -1

Channel#: A

NOTE: The Data Was Stored In File 9179P130:,700,0,1

Real Time Chromatogram of 3090-1/10-89059 P-1 From 0 min To 40 min Channel A: PID Channel B: HECD Range = 6 mV Offset = 2.551 mV Range = 65 mV Offset = -2.213 mV



Sample Name 3090-1/10-89059 P-1

NOTE: The Data Was Stored In File 9162PI28:,700,0,1

# CHAIN OF CUSTODY RECORD - EIS ENVIRONMENTAL ENGINEERS INC

8908 Sampler	10:  F 59   s: (Sign	Olurel	rid	h	Chemical R Bew	Quonlity	ol Containers	÷	370	10 mg	15/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2/2	(x*/			//		Remarks		=Inl	110
Jan.No.		Time	-	Grab	Station Location	on G	లి	7	1//				/		//		EIS #	Sam		Tope
B6-1	5/23		/		Plant Youd		/		$\checkmark$								30 78			
BG-2	,,		~		v		/		$\checkmark$								3079			
BG-3			V		٧		/		V								3080			
BG-4	٠		<b>V</b>		3		/		1	/							3081			
B1-A	٧			/	u	3	3	V.	~								3082			
BI-B				V	٠		3	V	1	/							3083			
BI-C				1	u		3	1	1	1						2	3084			
BI-D	٠,			1	ts		3	1	1								3085			
Ba-A	٠.			1	(.	3	3	$\checkmark$	V							-	3086			
Ba-B				V			3	$  \cup  $	1	<u>リ</u>							3087			
B2-C				1	٠,		3	1	1	1							3088			
32-0	٠,			V	15		3	1	1	1						<u> </u>	3089		1	
P-1	۲			1			3	$\checkmark$	/	1			1	+			3090		_	
				_						-	-		4	-	+-					
A Ju	hed by	Re	not	5/2	te Time Received	) )y:	Reli	inqu	ishe	d by:	l l						red by: anay Mye	المد		
Cinyquis	hed by	. 19		Da	le  Time Received	ργ:	Reli	inqu	she	d by:			0.	ale	Time	Receiv	red by			
ande of	Transpo	ortatio	n Els	S Vel	nicle	Public T		port	alior							Way o	r Air Bill No.			

# Appendix B IDEM Correspondence

#### CORPORATE OFFICE

3111 NORTH POST ROAD INDIANAPOLIS 46226-6566 (317) 898-8632 FAX (317) 895-0614

# WILIRII CIHI CHIEMIII CAIL, IINC.

ULRICH =

July 5, 1989

Ms. Jayne Browning
Office of Solid and Hazardous Waste Management
Department of Environmental Management
105 South Meridian Street
Indianapolis, Indiana 46285

BRANCHES
EVANSVILLE
TERRE HAUTE
FORT WAYNE
LOUISVILLE

Dear Ms. Browning:

This letter is to confirm the results of our meeting of June 30, 1989 and phone conversation of July 5, 1989. The issues discussed were concerning the soil sampling activities which are a portion of closure activities at Ulrich Chemical, Inc.'s Evansville facility.

As we discussed, the results of the analysis for the metals and total and amenable cyanides listed in the closure plan will be compared with the appropriate background value plus three times the standard deviation. If the results are less than the background plus three times the standard deviation, then we will consider the area unaffected by storage activities.

As you are aware, two results came out slightly over background plus three times the standard deviation. We believe that these results still indicate background conditions. For this reason, we are undergoing a literature search to determine if the results fall within previous determined background levels. In the event that the literature search is inconclusive or information is not readily available, then we anticipate taking two or three confirmatory samples in close proximity to the location of the original sample for which the result is in question. The actual number and location of the confirmatory samples will be finalized prior to sample collection. These samples would be reanalyzed for the parameter in question for that sample location and if those results are within the appropriate background value plus three times the standard deviation, then the area will be considered unaffected by operations and that the original result did actually reflect background conditions. During our meeting, we discussed the possibility of taking an additional background sample. We do not anticipate taking any additional background samples at this time. If that should change, you will be renotified by letter. Further, we anticipate that the analysis of these samples will be performed by a different laboratory than used for our first set of samples.

Unless I hear from you by July 12, 1989, we will assume that this is acceptable with you and will proceed with implementing the above items. If you have any questions, please feel free to contact me at (317) 898-8632.

Sincerely,

ULRICH CHEMICAL. INC.

Michael T. Scanlon

Director of Environmental Services

MTS/jb

cc: John Kyle, Barnes and Thornburg Mike Casper, Hoosier Environmental Services

# Appendix C Laboratory Analysis (Round 2)



NET Midwest, Inc. Indianapolis Division 6964 Hillsdale Court Indianapolis, IN 46250 Tel: (317) 842-4261 Fax: (317) 842-4286

#### ANALYTICAL REPORT

Mr. Mike Casper HOOSIER ENV. SERVICES, INC 550 Congressional Blvd. Suite 240 Carmel, IN 46032 08-24-89

P.O. NO.: 89059

Date Received: 07-20-89

Sample Number/ Parameters	Sample I.D.	Results	Sample Date/ Units
14648	SB-1B		07-19-89
Cadmium, Total		<0.2	ug/g
14649	SB-2B		07-19-89
Cadmium, Total		<0.2	ug/g
14650	SB-3B		07-19-89
Cadmium, Total		<0.2	ug/g

Joseph D. Shafer Division Manager



NET Midwest, Inc. Indianapolis Division 6964 Hillsdale Court Indianapolis, IN 46250

Tel: (317) 842-4261 Fax: (317) 842-4286

#### ANALYTICAL REPORT

Mr. Mike Casper HOOSIER ENV. SERVICES, INC 550 Congressional Blvd. Suite 240

Carmel, IN 46032

07-26-89

Sample No.: SEE BELOW

P.O. NO.: 89059

Sample Description: SEE BELOW

Date Taken: SEE BELOW Date Received: 07-20-89

Barium, Total

14645 SB-1A 210. 07-19-89 ug/g 14646 SB-2A 230. ug/g 07-19-89 14647 SB-3A 125. 07-19-89 ug/g

Tough D. Shaper /ld

Joseph D. Shafer Division Manager

# CHAIN OF CUSTODY RECORD -

ART-ART	
劉 韓OOSHER	*
B ENVIRONM!	ATAL
ENVIRONMI SERVICES, I	INC

550 Congressional Blvd. Suite 240 Carmel, Indiana 46032 (317) 573-6434

Conglers: 1signature)	CHEMICAL	Quantity of Containers	4.		Stay lety	multiple AN				Remarks	0 NL 1=101 B=B:0	acl
Ma.No. Dole Time &	Station Location	C	1/	(E) X	2111/19/1		//	//	//		Sample State	Tape
B-1/19/84	X   (12-18")	1	X	ĺ								
3-1B 11	X (18 - 24")	1		X							1	
B-2A "	X (12-18")	1	X		Ì							
3-2B "	x (18-24")	1		X								
3-3A 1	X (12-18")	1	X									
,B-3g '1	X (18-24") (3-5MAII TARS)	3		×								
C.P.R.	COMPASSIVE PHO RENSE		X	X	X			+	+			
<sup>2</sup> . R.	COMPASSIVE PAO RENSE FINAL PAD RENSE		*		*					Hold for possible analysis later		
Sough C. Heweld	The line Received by:	Rei	inqu	! ushe	d by:	!! <u></u> .	00	ate	Time	Received by:		
elinquished by:	Date   Time   Received by:	Reli	inqu	ishe	d by:		Do	ale	Time	Received by:		
ode of Transportation	Vehicle Publi Carr	c Trans ier:	port	alion	14				,	Way or Air Bill No.		

ANALYZE GOTL GAMPLES AND COMPOSETE PAD RENGE ONLY. HOLD FINAL PAD RINGE GAMPLE!

Cover	Page
-------	------

Contract Laboratory Service Inorganic Analyses Data Package Dota: 12-19-89 . Lab Name: Net, Midwest, Indpls. Q.C. Report No.: Facility Hama: HOOSDER ENV. . Site Inventory Ho. ;\_\_\_\_\_ Region: Co.: Sample Humbers Lab ID Lab 10 Monitor Point No. Humber Monitor Point Ho. Humber ... C. ROLP 工. 13860-61 II. 14454-55 III . · 14645, 46,47 . 14648, 49,50 14651 亚. 16312,13,14,15 工, 16383,84 Coments: SAMPLES GROUPED TOGETHER WERE: ANALYZED ON SAME DAY. DURLECATE AND SPIKE RESULTS NOT PERFORMED ON PARTICULAR. SIMPLES BUT ON CTHER MATRIX STUPLES WITHIN STIME RUN. 10P Interelement and background corrections applied? Yes \_\_\_\_ No \_\_ If yes, corrections applied before \_\_\_\_\_ or after \_\_\_\_ generation of raw data. Footnotes: - not required by contract at this time Chemical Analysis Form: Value - If the result is a value greater than or equal to the instrument detection limit but less than the contract required detection limit, report the value in brackets (i.e., [10]). Indicate the analytical method used with P (for ICP/Flame AA) or F (for furnace). Indicates element was analyzed for but not detected. Report with the detection limit value (e.g., 100). - Indicates a value estimated or not reported due to the presence of interference. Explanatory note included on cover page. - Indicates value determined by Method of Standard Addition.

Indicates spike sample recovery is not within control limits.
 Indicates duplicate analysis is not within control limits.

- Indicates the correlation coefficient for method of standard addition is less than 4.775-

	Q.I	C. Fo	cm VI	
Q.C.	Report	No.		

#### Instrument detection limits and laboratory control sample

ATE: <u>12-19-89</u>	<b></b> ·	LCS UNITS:(u	g/l Circle on	mg/kg e)	
Compound Metals:	( Limits (CROL)-ug/l	II Instrument Detection II Limits (IBC) ug/l II ICP/AA Furnance		Control Samp I Found	le 1 \$48
1. Aluminum		(1   1	(1 <u> </u>	i !	
2. Antimony		.((	!!	!	! !
3. Arsenic	!	ــ ــاــ ــا	11	!	!
4. Barium	!N.A	11_1001	ii_ ′⁄₁·∀· ¯	!	!
5. Beryllium	!	<u> </u>	!!	! !	!
6. Cadmium	iN.A	11_101	11_ N.A		!
7. Chromium	!N.A	11 3 <i>o</i> i	ii_ pi-A	ļ	<u>:</u>
8. Cobalt		11	.!!	<u></u>	<u>:</u>
9. Copper	_ <u>-</u> i		!!	<u> </u>	<u>!</u>
0. Iron		<u> </u>	!!		-
1. Lead	!N.A		!!_N.A	<u> </u>	<u>:</u> —
2. Manganese	_ <u>}</u>	!! ! _!!!	11 11	<u> </u>	<u> </u>
3. Hercury			11	1	<u>-</u> -
4. Hickel		_!!	!!	<u> </u>	<u>:</u> —
5. Selenium	<u> </u>		11	<u> </u>	<u> </u> _
6. Silver		<u> </u>	!!	<u> </u>	-
7. Thallium			!!	<u> </u>	<u> </u> _
8. Vanadium	1		11 11	1	1

#### BLANKS

LAB	HYE:	Net, Midwest,	Indpls.

SITE INVENTORY NO. GROWP III 14645-51

DATE: 12-19-89.

UNITS: \_\_\_\_ ug/L / ABSORBANCE \_\_\_\_\_\_.

Matrix:\_\_\_\_\_\_.

	paration pound	Initial     Calibration     Blank Value     (conc/abs)	( Blank Value   1 2  (	
1.	Alusinus		1 10L - u1	
2.	Antimony		1 110L - u1	
3.	Arsenic	i 10t - ui_	I 10L - u I	
4.	Barium	110tu1	1_ 10c-u_1 100-u	
5.	Beryllium	i 10t - ui_	i 10t - ui	
6.	Cadmium	i 10t - ui_	1 101 - u 1 10 - u	
7.	Chromium	i IOC - ui_	1 10c - u _ 1 30 - cc	
8.	Cobalt	i IOL - ui_	i 10L - ui	
9.	Copper		i 10L - ui	
10.	Iron	i IOL - ui		
11.	Load	i 10L - ui	100-u 50-u	
12.	Manganese	10L - u	i IOL - ui	10L - u
13.	Hercury		1 IOL - u	10L - u
14.	Hickel		i 10L - ui	
15.	Selenium		.i 10L - ui	
16.	Silver	i IOL - ui		
17.	Thellium			1 1 10L - u
18.	Vanadium			
19.	Zinc	I IDL - uI	1 10L - u	_ <u>-</u> !
1_			<u> </u>	_ü

## SPIKE SAMPLE RECOVERY

DATE:12-19-89	•	Metrix:	Lab Sae Units	ple 10 Ho	
Compound	1 Control Limit 1	Spiked Sample Result (SSR)	I Sample I I Result (SR) I	Spiked Added (SA)	1 128 (1)
1. Aluminum	_!				
2. Antimony					-
3. Arsenic					
4. Bariua	+/-10%	1800.	100-u	2000.	90.
5. Beryllium					<u> </u>
6. Cadmium	+1-10%	520.	10-u	500	104.
7. Chronius	1/- 10%	540.	1 30-u	500	108
8. Cobalt		<u></u>	<u> </u>		<u> </u>
9. Copper	_}		<u></u>		<u> </u>
18. Iron			<u>i</u>		<u> </u>
11. Lead		530.	1 50-W	5to	106
12. Manganese	- <del> -</del> -		<u> </u>	<u>_</u>	<u> </u>
13. Hercury	- <del> </del>	<u> </u>	<del> </del>		.1
14. Kickel	- <del> -</del>	<u> </u>	-1	<u> </u>	1
15. Selenium	- <del> </del>	¦	-1	<del> </del>	
16. Silver	- <del> </del>	!	-	<u> </u>	:
17. Thellium	- <del> </del>	<del> </del>	-1	<del> </del>	1
18. Vanadium	- <del> </del>	!		-	<del> </del>
19. Zinc				<u> </u>	<del>'</del>
1			<u> </u>		_!

	Q.C. Form U	
Q.C.	Report No.	

#### DUPLICATES

AB HAYE: <u>Net, Mid</u>		HONITOR POINT NO.: HONITOR POINT NO.: Lab Sample ID No.: Units: ug/L						
 Compound	!   Control Limit (1)	Samples (S)	1 Duplicate (0)	1 RPD (2) or D (3)				
1. Aluminum			!	-				
2. Antimony			<u> </u>	<u> </u>				
3. Arsenic			1	<u> </u>				
4. Barium	+1-20%	100-L	1 100-L	I NC				
5. Beryllium .			!	ļ				
6. Cadmium	+1-20%	10-4	10-u	NC				
7. Chromium	11-30%	30-LL	30-L	NC				
8. Cobalt			<u>-</u> !	ļ				
9. Copper			<u> </u>	<u> </u>				
6. Iron			<u>.</u>	<u> </u>				
1. Lead	11- 20%	50-11	50-W	i NC.				
2. Manganese			<u> </u>					
3. Hercury			<u>i</u>	<u> </u>				
4. Nickel			<u> </u>	<u> </u>				
5. Selenium			<u> </u>	<u> </u>				
6. Silver				<u> </u>				
7. Thallium				<u> </u>				
8. Venedium			_!	_				
19. Zinc			1	_i				

(1) +/- 20% or +/- DROL

RPO: Relative Percent difference

(1) +/- 20% or +/- DROL
(2) RPD = (S - D/((S+D)/2)) x 100
(C - Non calculation RPD due to value(s) less than DROL.
(3) D = |S - D| A control limit of +/- the CROL shall be used for sample values less than five times the CROL.

<sup>·</sup> Out of Control

## Appendix D Geraghty and Miller Report

# COMPARISON OF ANALYTICAL RESULTS FOR BARIUM AT THE STORAGE UNIT AT ULRICH CHEMICAL, INC., EVANSVILLE, INDIANA WITH DATA FROM STUDIES IN SIMILAR ENVIRONMENTS

#### Prepared For:

Ulrich Chemical, Inc. 3111 North Post Road Indianapolis, Indiana 46226

#### Prepared By:

Geraghty & Miller, Inc. 101 W. Ohio St. Suite 1450 Indianapolis, Indiana 46204

# COMPARISON OF ANALYTICAL RESULTS FOR BARIUM AT THE STORAGE UNIT AT ULRICH CHEMICAL, INC., EVANSVILLE, INDIANA WITH DATA FROM STUDIES IN SIMILAR ENVIRONMENTS

The analytical results for barium obtained from the soil sampling within the storage facility have been compared with concentrations of barium measured in a study of surface soils in similar environments within the midwest region (specifically, a study in Michigan was most applicable). The purpose of this comparison is to evaluate whether the concentration of barium in soil at the storage unit is greater than typical background concentrations in the midwest.

The concentrations of metals measured in studies is often presented either as a range of values or as a mean and a standard deviation. Where data is presented as a range, the analytical results within the storage pad can be compared to the upper value of the range. Where data is presented as a mean and standard deviation, the analytical results from the storage pad can be compared to the mean plus three times the standard deviation of the values from the studies.

The primary source of data on barium that was uncovered was from studies performed by the Michigan Department of Natural Resources (MDNR) which has conducted a number of studies that include data on barium concentrations in soil. These studies are for a variety of different soil types and have varying ranges of barium concentration. One study, performed in 1987, indicates a

mean background concentration of barium in clay soil of 95.92 mg/kg and a standard deviation of 55.9 mg/kg based on 57 samples (MDNR 1987). This study was referred to by the MDNR as a general reference for typical background soil concentrations. This study is applicable to the Ulrich facility in Evansville because that facility is also located over a clayey soil [the Zipp series (Kelly 1976)]. The value of the mean plus three times the standard deviation for barium from the 1987 MDNR study is 264 mg/kg. The concentrations measured at the storage pad at the Ulrich facility were 210, 230, and 125 mg/kg which are less than the concentrations measured in the Michigan study.

In conclusion, the mean plus three times the standard deviation of barium from a study of background soil concentrations in the midwest in similar soils is greater than the concentration at Ulrich's Evansville facility.

Respectfully submitted,

GERAGHTY & MILLER, INC.

Oren Gottlieb Staff Scientist

Staff Scientist

Keith Flemingloss

Associate

#### REFERENCES

- Kelly, L. A. 1976. Soil Survey of Vanderburgh County, Indiana, U.S.Department of Agriculture, Soil Conservation Service, 91 pp.
- Michigan Department of Natural Resources. 1987. Typical background concentrations for heavy metals in Michigan surficial clays, 3 pp.

### Appendix E Photographic Documentation

T

H

П



NET Midwest, Inc. Indianapolis Division 6964 Hillsdale Court Indianapolis, IN 46250

Tel: (317) 842-4261 Fax: (317) 842-4286

#### ANALYTICAL REPORT

Mr. Mike Casper

08-24-89

HOOSIER ENV. SERVICES, INC

Sample No.: 14651

550 Congressional Blvd. Suite 240

Carmel, IN 46032

P.O. NO.: 89059

Sample Description:

COMPOSITE PAD RINSE

Date Taken: 07-19-89

Date Received: 07-20-89

<u>Parameters</u>	Results	<u>Units</u>
Barium, Total	1.5	mg/L
Cadmium, Total	<0.01	mg/L
Chromium, Total	0.09	mg/L
Lead, Total	0.07	mg/L

Joseph D. Shafer Division Manager



NET Midwest, Inc. Indianapolis Division 6964 Hillsdale Court Indianapolis, IN 46250 Tel: (317) 842-4261

Tel: (317) 842-4261 Fax: (317) 842-4286

#### ANALYTICAL REPORT

Mr. Mike Casper HOOSIER ENV. SERVICES, INC 8021 Castleton Road Indianapolis, IN 46250

09-29-89

P.O. NO.: 89059

Date Received: 09-26-39

Sample Number/ Parameters	Sample I.D. Results	Sample Date/ Units
16383	PAD FINAL RINSE	09-25-89
Chromium, Total Lead, Total	<0.03 0.06	mg/L mg/L
16384	PAD COMPOSITE	09-25-89
Chromium, Total Lead, Total	<0.03 0.12	mg/L mg/L

Joseph D. Shafer Division Manager

Cover 1	Page
---------	------

Contract Laboratory Service Inorganic Analyses Data Package

Date: 12-19-89

Lab Name: Net, Midwest, Indp	ols. Q.C. Re	Q.C. Report Ho. :				
Site Inventory No. ;	Facilit	y Hom: HOOSDER	ENV.			
Region:Co.:	i, N	** ** * * * ***	3			
			*			
	Sample Humbers					
Konitor Point No. Humber	Moni		ab ID weber			
GROLP	· · ·					
工. 1386	0-61 ! _	ppy -	·•			
	14-55 I		•			
<u>111</u> 1464	5 46 47					
		-				
1464	8,49,50 I		•			
1465	<u> </u>		· ·			
亚. 163	12,13,14,15					
工:163	82'8d -					
	i _		•			
oments: SAMPLES GROW	OCO TREDIM	0 = 4 44 × 7 570	Sime Day			
Duri ICATE AND SP						
SAMPLES, BUT OR						
OP Interelement and background correct f yes, corrections applied before  controles:	or after gene					
	at time the	*				
hemical Analysis Form:						
the contract required de-	greater then or equal to the tection limit, report the welu- ith P (for ICP/Flame AA) or F	e in brackets (i.e., [10]).				
- Indicates element was an	alyzed for but not detected.	Report with the detection li	eit value (e.g., 10U			
<ul> <li>Indicates a value estima</li> <li>on cover page.</li> </ul>	ted or not reported due to the	presence of interference.	Explanatory note inc			
on cover page.						
	ed by Method of Standard Addit		9			
- Indicates spike sample r	ed by Method of Standard Addit economy is not within control yais is not within control lie	lisite.				

,	Q.C. Form VI	
Q.C.	Report No.	

#### Instrument detection limits and laboratory control sample

		METH	~^	- (	circle one	:)	
Compound Metals:	Required Detection Limits (CROL)-ug/1	II Instru	int Detection (IBC) ug/1 Furnance	11 11 11	Lab True I	Control Samp Found	le 1 %R
1. Aluminum		11	_!	([		•	
2. Antimony	<u> </u>			!!_			<u>!</u>
3. Arsenic			<u>.</u> .	: !! !!_			<u>!</u>
4. Berium	N.A	11_100.			_N.A		<u> </u>
5. Beryllium		_!! _!!		11_ 11_			<u>.</u> i
6. Cadmium	iN.A	_1110.	_}		_N.A		<u>-i</u>
7. Chromium	N.A	_11 30.	- <u>i</u>	ii_	- V:·A·-	<u> </u>	<u>-i</u>
8. Cobalt	<u> </u>	_ii	_	ii		!	<u>:</u>
9. Copper	_ <u>-</u> }	-ii	_	—¦;			<u>-i</u>
0. Iron	_ <del>-</del> }	-::-				<u>.</u>	<u>:</u>
1. Lead	iN.A	_11 50	<u></u>		_N.A	<u>.                                    </u>	<u>}</u>
2. Manganese	<u>i</u>	_;;		ii		i	- <u>}</u>
3. Hercury	_ <u> </u>	_ii		ii		<u>i</u>	
4. Hickel	_ <u>;</u>	_;;	_ <u>i</u>	ii		<u> </u>	- <u>i</u>
5. Selenium	_ <u>;</u>		_ <u>}</u> _	-"		i	- <u> </u>
6. Silver		_;;	- <u>i</u>	— <u>;;</u>			
7. Thellium		_ii			- n		-
8. Vanadium				!! !!		1	_1
19. Zinc	<del></del>	_ii		— <u>;;</u>		<u> </u>	

Q.C. Form II
Q.C. Report Ho.

#### BLANKS

LAB	HYE:	Net, Midwest,	Ind	pls.

SITE INVENTORY NO. GROUP III 14645-51

DATE: 12-19-89.

UNITS: \_\_\_\_ ug/L / ABSORBANCE \_\_\_\_\_

Hetrix:\_\_\_\_

		I Initial II		Calibration     1	
	paration pound	Calibration         Blank Value        (conc/abs)[]	1	k Value   1   2   1   1   1   1   1   1   1   1	Blank
1.	Aluainus	110L - u1	and the second second		10L - u
2.	Antimony		10L - u		IOL - u
3.	Arsenic	11DL - u1_1	10L - u		10L - u
4.	Barium	i 10L - u(_i	10C - u	1 100-u	IOL - u
5.	Beryllium		10C - u	- - -	10L - u
6.	Codmium	i IOL - ui_i	10L - u	A CONTRACTOR OF THE CONTRACTOR	
7.	Chronium	i IDL - ui_i		1 30-u 11	IOL - u
8.	Cobalt	i_ IOL - ui_i	10L - u		[ 10C - u
9.	Copper		10L - u		
0.	Iron	I IOL - uI_I		<u> </u>	I IOL - u
1.	Lead			50-u	I 10L - u
12.	Manganese				I 10L - u
3.	Hercury		10L - u		1 <u></u>
4.	Hickel		10L - u		I IOL - u
5.	Selenium	110L - u	10L - u		I IOL - u
6.	Silver		IOL - u		i 10L - u
7.	Thellium		IOL - u	-!	1 10L - u
18.	Vanadium	i IOL - ui_	10L - u	-!!	I 10L - u
19.	Zinc	IIDL - uI_I	•	 	•

#### BLANKS

LAB	HATE:	Net, Midwest,	Indpls.	

SITE INVENTORY NO. GROUP V 16383-84

DATE: 12-19-89

UNITS: \_\_\_\_ ug/L / ABSORBANCE \_\_\_\_

1.1

. Metrix: Initial Continuing Calibration 1 1 11 Preparation Calibration 1 1 Blank Value Procedural 11 2 Blank Value Compound 1 1 11 Blank (conc/abs) 11 11 1. Aluainua 10L - u 1.1 10L - u 11 IOL - u . 11 11 2. Antimony 10L - u \_ 10L - u 11 11 IOL - u 11 11 3. Arsenic 10L - u 11 1\_1 10L - u \_ IOL - u \_\_\_\_\_. 1 1 11 1DL - u 4. Barium 1\_1\_ 11 IOL - u \_ 10L - u 11 11 5. Beryllium 10L - u 1\_1\_ 10L - u \_ 1.1 IDL - u \_\_ 11 11 6. Cadaius 10L - u IOL - u \_ 11 11 11 30-u IDL - u IOL - u \_\_\_\_\_. 7. Chronium 1.1 10L - u 11 11 11 IDL - u 8. Cobalt 10L - u 1\_1\_ 11 10L - u . 11 9. Copper 10C - u 11 10L - u \_ 11 11 10. Iron 10L - u 1.1 10L - u 11 IDL - u \_\_ 11 11 50- u 11. Lead 10L - u IOL - u \_\_\_\_ 10L - u 1\_1\_ 11 11 10L - u 10L - u \_\_\_\_\_. 12. Manganese 10L - u 11 11 11 11 13. Hercury 10L - u IOL - u \_\_\_\_\_. 1\_1 10L - u 1.1 11 11 14. Hickel 11 IOL - u \_\_\_\_\_. 10L - u 11 10L - u 11 11 15. Selenium 10L - u 11 10L - u 1.1. IOL - u \_\_\_ 11 11 16. Silver 10L - u 10L - u \_\_ 10L - u 11 1\_1\_ 11 11 17. Thellium 10L - u 10L - u 11 IOL - u \_\_\_\_\_ 11 11 18. Vanadium IOL - u . 1\_1\_ 10L - u \_ 10L - u 1.1 11 19. Zinc 10L - u 11 1.1 10C - u 11 11

1\_1\_

#### Q.C. Form 1 Q.C. Report No.

#### INITIAL AND CONTINUING CALIBRATION VERIFICATION (3)

LAB HATE:	Net.Midwest, Indpls.		ITE INVENTORY NO.	GROUP III- K/645	<u>-5</u> 1
DATE:	12-19-89	t.	HITS:	_ug/L	

		Ini	tial Calib	.(1)		_Continuin	Calibra	tion (2)		
Compound		1 True 1 Value	l I Found	1 1 142 1	11 True 11 Value 11	1 Found	1 1 \$48 1	I Found I	<b>\$</b> 200	f Kethod(4)
1. Aluminum	21.54		i 1	7	(i (i	i I				i _IP
2. Antimony		<u> </u>	! !	!	u .u_ · _	! !	!	!!		·( _i P
3. Arsenic		<u> </u>	<u>!</u>	-	11 .11	<u>!</u>		<u></u>		<u> </u>
4. Barium		13,000	13000.	<u>i 1∞.</u>	11_3000.	2900	196.	!		_i P
5. Beryllium		<u>-</u> -	<u>:</u>		.!!	-				_i P
6. Cadmium		_i_kxxo	1980.	<u>198.</u>	11_1000.	11030.	1 103	i		_i P
7. Chromium		_i_10∞ 1	1 1010.	101.	117000.	11090	109.		i	_i P
3. Cobalt			!	1	_U	<u>-</u>	! !	<del></del>	!	_!P
Copper		<u>-</u>	1	1	11	1	1	!	<u>'</u>	_!P
). Iron	-	17000.	11040	1104.	11_1000.	1 1050.	105	-	!	-¦ <sup>p</sup>
l. Lead		<u>-1</u>	<u> </u>	<del> </del>	_11	<del> </del>	1	<del>!</del>	(	-
?. Manganese		-i -	t	<del>'</del>	-11 11	1	<u></u>	<del>-</del>	!	-¦ <sup>P</sup>
5. Hercury		1	1	!	-d 11	-	!	1	:	-[ P
i. Hickel		<del>-</del>	1	!	_((_ 	<del>'</del>	-	<u>'</u>	1	-¦ <sup>p</sup>
Selenium	ű.	<u>-</u> -	<u> </u>	-	-1 <u>-</u> 11		l	<del> </del>	!	
S. Silver	-	- <u>'</u> - !		<del> </del>	_11	<del>-</del>	!	<u> </u>	<u> </u>	_!P_
7. Thellium 3. Vanadium	-				_11	-	-	1	1	_'
. Zinc		† -	<del>`</del>		_11_ 	ï	<u>;</u>	ì		-¦
	-	- <u>'</u> -	ì	ï	-11 -11 -11	ï	<u>;</u>	ï	i	- <u>;</u> `-

(1) Initial Calibration Source:

(2) Continuing Calibration Source:

(3) Control Limits: Mercury 80-120; All other compounds 90-110

(4) Indicate Analytical Method Used: P-ICP/Flame AA; F - Furnace.

#### Q.C. Fore 1

#### 

LAS HATE: Net, Midwest, Indpls.	SITE INVENTORY NO. GROUP I - 16383-84
DATE: 12-19-89	UNITS:

						30.1			
•	1 True	tial Calib 1	1	II True	1	g Calibra 1	1 1		1
Coepound	Value  l	I Found	1 14R 1	11 Value	I Found	1 \$42 1	Found	\$2R 	1 Hethod(4)
1. Aluminum	_ii_	1	1	11_ _11_	l 1	and the	(		Ι 1P
2. Antimony		!	1	_11	<u> </u>	1	( (		·( _(P
3. Arsenic	_} _		! !	11 _11	<u>!</u>	<u> </u>	!		<u> </u>
4. Barium	_ <u>-</u> }-		<u>-</u>	11 _11	<u> </u>	<u> </u>	!	l I	-¦P
5. Beryllium	_i	<u>.</u>		.: _!!	<u> </u>		<u> </u>	<u> </u>	-i P
6. Cadmium	_ <u>;</u>	<u> </u>	<u>-</u>	_ii	<u> </u>	<u> </u>	<u> </u>	i	_i_ P
7. Chromium		970.	97.	_ii_/v∞.	970.	97.	-	!	-i_ P
3. Cobalt	_ <u>:</u>		<u>i</u>	_((	<u>-i</u>	<u>i</u>	<u> </u>	i	_i P
Copper				_11_ _11	<u> </u>	<u> </u>	<u> </u>	!	_iP
. Iron		<u></u>	<u> </u>	_11_		.i	<u> </u>	<u></u>	_ie
. Lead		1060.	1 106	_!!]∞: -!!]∞:	1070	107.	!	!	<u> </u>
. Manganese	_}	<u>.                                      </u>	<u>!</u>	_11	<u> </u>	<u>:</u>	<u> </u>	ļ	_!
. Hercury		<u> </u>	-	_(1 _(1	-	ļ	<u> </u>	!	_ie_
i. Hickel	_ <u>-</u>	<u> </u>	<u>:</u>		- <u> </u>	<u>i</u>	}	1	_i_ P
5. Selenium	_}	<u>.</u>	<u>-</u>	1	- <u> </u>	<u> </u>	<u>:</u>	<u> </u>	- <u>i</u>
6. Silver	<u>-</u> -	<u> </u>	<u>-</u> }	_ii_	<u>-}</u>	<u> </u>	<u> </u>	<u></u>	_i_ P _
7. Thellium	_}-	<u>i</u>	<u>:</u> —	_ii_	<u>-</u> i	<u> </u>	<u>-</u>	<u>-</u>	_i_
B. Vanadium	_}	<u>;</u>	- <u>-</u> -	_!!_		- <u>}</u>	<u>:</u>	<u> </u>	_iP_
9. Zinc	_ <u>-</u> ;	<u> </u>	- <u> </u>	_!!_	<u> </u>	<u> </u>	<u>:</u>	<u>:</u>	_i_
	i	1	ì	_11 11	i	i	1	1	_i

(1) Initial Calibration Source:

(2) Continuing Calibration Source:

(3) Control Limits: Mercury 80-120; All other compounds 90-110

(4) Indicate Analytical Method Used: P-ICP/Flame AA; F - Furnace.

# SPIKE SAMPLE RECOVERY

		Matrix:	Lab Sae Units	ple 10 Ho	<u> </u>
Coepound	Control Limit     128	Spiked Sceple Result (SSR)	I Sample I I Result (SR) I		(   \$R (1)
1. Aluainua	_!		- 27		1
2. Antimony			-		! 
3. Arsenic					<u> </u>
4. Barium	t/- 10%	1800.	1 100-u	2000.	90.
5. Beryllium			<u> </u>		! !
6. Cadaiua	<u> </u>	520.	1 10-u	500·	1 104.
7. Chronius	1-10%	540.	1 30-u	500	1_108.
8. Cobalt	_\		l	<u> </u>	!
9. Copper	_!	l	1	<u> </u>	t 1
18. Iron	<u> </u>	!		! !	1
11. Lead	41-10%	1 <u>530.</u>	1 50-u	500	1 106
12. Manganese	_!	! !	1	<u>.                                    </u>	!
13. Hercury	_\	! !	<u> </u>	<u> </u>	! !
14. Hickel		! !	.l	! !	1 1
15. Selenium		1 !	1	!	! .!
16. Silver	_l	l !	· · · · · · · · · · · · · · · · · · ·	·	1
17. Thellium		( 	<u> </u>	<u> </u>	· 
18. Vanadium			 	! !	! !
				1	
	-	1	!	1	1

ITE: 12-19-89		HON	ITOR POINT NO		
	•	Matrix:	Lab Sac	ple 10 Houg/L	
epound	Control Limit	Spiked Sample Result (SSR)	1 Sample 1 Result (SR)	Spiked Added (SA)	( \$R (1)
. Aluminum					
. Antimony					<u> </u>
. Arsenic					<u></u> .
. Barium					! !
. Beryllium					!
. Codaiva					!
. Chronius	+/- 102/3	410.	30-u	400.	102.
. Cobalt					<u>.                                    </u>
. Copper			ļ	<u> </u>	<u> </u>
· Iron		-1 -1 -2 -	the supplied to the	equite quality	Somethings on
. Lead	+1-10%	480	50-u	_570 _	910
. Manganese	- <u> </u>		<u> </u>		<u> </u>
. Hercury	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
. Kickel		i	<u> </u>	<u> </u>	<u> </u>
. Selenium	- <del> </del>	<u> </u>	<u>.i</u>	<del></del>	<del>'</del>
. Silver	- <del> </del>	<del> </del>	<u> </u>	<u></u>	<u>'</u>
. Thellium	- <del>}-</del> -	1	<u> </u>	<u> </u>	<del> </del>
. Venedius	- <del> </del>	<u> </u>	<del> </del>	<del></del>	<del>:</del>
. Zinc	- <del> </del>	1	-{	<del> </del>	1
	_i	i	<u>.i</u>	<u> </u>	i

10.0	Q.C. Form U			
Q.C.	Report No.	100	. 4	

#### DUPLICATES

DATE:	. Katr	- HONITO	R POINT NO.: Lab Sample II Units: ug	0 Ho.:
Compound	Control Limit (1)	Samples (S)	1 Duplicate (0)	1 RPD (2) or D (3)
1. Aluminum			<u> </u>	<u> </u>
2. Antimony			-	<u> </u>
3. Arsenic			<del> </del>	<u> </u>
4. Barion	+1-20%	100-L	1 100-w	1 NC
5. Beryllium 6. Cedmium	+1-20%	10-L	1 10-u	NC
7. Chronium	1-20%	30-L	1 30-u	I NC
8. Cobalt			ļ	
9. Copper and c	ger annager der besteht der Art bei eine der	. 16 * \$ 17 \ 2 to 4 to 5	e es es es es es estado de el	· CONTRACTOR CONTRACTOR
18. Iron	+/- > -/	l	<del>\</del>	1
1. Lead	+1- 20%	1 <u>50-11</u>	50-W	i NC
12. Manganese 13. Mercury			1	
14. Hickel		1	1	1
15. Selenium		1		<u> </u>
l6. Silver	<u> </u>	1	<u>i</u>	<u>i</u>
17. Thellium		! !	-{	<del>-</del>
18. Venedium		!	-!	<u> </u>

(1) \*/- 20% or \*/- DROL

RPO: Relative Percent difference

(2) RPD - (S - D/((S+D)/2)) x 100 (3) D - S - D

AC - Non celculable RPD due to value(s) less than CRDL. (3) D - S - D

A control limit of +/- the CROL shall be used for sample values less than five times the CROL.

<sup>•</sup> Out of Control

	Q.C. Form V
Q.C.	Report No.

#### DUPLICATES

MTE: 12-19-89		HONITOR	POINT NO.: Lab Scaple II Units: ug	) Ho.:
Compound	Control Limit (1)	Samples (S)	Ouplicate (0)	1 RPD (2) or D (3)
1. Aluminum				!
2. Antimony				!
3. Arsenic			! !	<u> </u>
4. Barium				!
5. Beryllium	}			<u> </u>
6. Cadeive	<u>}</u> }		<u> </u>	<u> </u>
7. Chromium	+1-200/6	30-14	30-u	i NC
8. Cobalt	_ <del>`</del>			<u> </u>
Copper	_ <u>}</u> }	V. A. Service Vicence Co.		and the second s
0. Iran	<u></u>		<u> </u>	<u> </u>
1. Leed	<u>+1-20%</u>	50-cc	50-cc	i NC
2. Manganese			<u> </u>	<u>-i</u>
3. Nercury			<u> </u>	<del></del>
4. Hickel _			1	<u> </u>
5. Selenium			<u> </u>	1
6. Silver _			<u> </u>	<del></del>
7. Thellium	i		<u> </u>	<del></del>
8. Venedium			1	-1
19. Zinc	ii		<u></u>	_1

(1) +/- 20% or +/- CROL

(2) RPD = [S - D/((S+D)/2)] x 100

HC - Hon celculable RPD due to value(s) less than CROL.

(3) D = [S - D]

control limit of +/- the CROL shall be used for sample values less than five times the CROL.

# CHAIN OF CUSTODY RECORD -

550 Congressional Blvd. Suite 240 Carmel, Indiana 46032 (317) 573-6434

Samplers: Usignature)	CHEMICAL	Quantily of Containers	4.	27/2/2/	opad to	MULTINE AND	//			Remarks	LA ONL I=Int B=Bro	acl
Sta.No. Dale Time 8	Station Location		//	6/V	2/1/2/	//	//	$\angle$	//		Stole	Tape
SB-1/19/89	X (12-18")	11	X									
5-1B "	X (18 - 24")	1		X						*.		
1B-2A "	X (12-18")	1	X									
B-28 "	x (18-24")	1		X								
B-3A N	X (12-18")	1	X									
6B-38 "	X (18-24")(3-5MAII JARS)	3		×					-			
C.P.R.	COMMOSTYE PAD RENSE		X	X	X		$\dashv$		-			
D. R.	COMPOSITE PAD RINSE FINAL PAD RINSE	-	*		*		-		-	Hold for possible analysis later		
clineyished by:	Date Time Received by:	Rel	inqu	uisho	d by:		1	Date	Time	Received by:		
elinquished by:	Date Time Received by:	Rel	inqu	ushe	d by:			Dale	Time	Received by:		
ode of Transportation	Vehicle Publi	c Trans	boc	alio						Way or Air Bill No.		

ANALYZE GOTL GAMPLES AND COMPOSETE PAD RENGE ONLY. HOLD FINAL PAD RENGE GAMPLE!

ENVIRONMENTAL.

٦

1

1

550 Congressional Blvd. Suito 240 Carrnel, Indiana 46032 (317) 573-6434

CHAIN OF CUSTODY RECORD

49059 () Line & Ch.	omical - Ellansville				ONLY	.; .;
- E,	alure Bray P. Beach			Remarks	1=Intact B=8:oken	
Date Time Comp	Station Location				Sample To	Tape
5, WALKINSE 9/25/5, 1:30	Pad Rinse Dehind					
100:1 55/3/ Fired mo						
						T
						-
d Vill	Wally 4:30 Dr. da Davis	Refinduished by:	Date Time	Received by:		
quarted by:	e Time Ke	Relinque shed by:	Dote Time!	Time Received by:		
Se of Transpariation Ve	Vehicle Public Tro	Transportation				:
			>	Way or Air Bill Ro		



Thursday March 19, 1987



# Environmental Protection Agency

40 CFR Part 265

Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Final Rule



# ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 265

[SW-FRL-3092-1]

Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Final Rule

AGENCY: Environmental Protection Agency (EPA). ACTION: Final rule.

SUMMARY: The Environmental Protection Acency is today amending the interim status regulations for closing and providing postclosure care for hazardous waste surface impoundments (40 CFR Part 265, Subpart K), under the Resource Conservation and Recovery Act (RCRA).

The Agency proposed today's modifications to the interim status standards on July 26, 1982. Today's amendments provide conformance between certain interim status requirements for surface impoundments and those requirements contained in the permitting rules of 40 CFR Part 264. that were also published on July 26, 1982. The Agency is also setting forth its interpretation of the regulatory requirements applying to closure of storage facilities regulated under both permits and interim status.

EFFECTIVE DATE: These final regulations become effective on September 15, 1987, which is six months from the date of promulgation, as RCRA section 3010(b) requires.

ADDRESS: The docket for this rulemaking (Docket No. F-87-CCF-FFFFF) is located in Room MLC100. U.S. Environmental Protection Agency. 401 M Street. SW., Washington, DC and is available for viewing from 9:00 a.m. to 3:30 p.m., Monday through Friday, excluding holidays. Call Mia Zmud at 475-9327 for appointments.

FOR FURTHER INFORMATION CONTACT: RCRA hotline at (800) 424-9348 (in Washington, DC, Call 382-3000) or for technical information contact Ossi Meyn, Office of Solid Waste (WH-565E), U.S. Environmental Protection Agency, Washington, DC 20460, telephone (202) 382-4654.

#### SUPPLEMENTARY INFORMATION:

#### I. Authority

These regulations are issued under the authority of sections 1006, 2002(a), 3004 and 3005 of the Solid Waste Disposal Act (SWDA), as amended by the Resource Conservation and Recovery

Act (RCRA) of 1978, as amended (42 U.S.C 6905, 6912(a), 6924, and 6925).

#### II. Background

Subtitle C of RCRA creates a "cradleto-grave" management system intended to ensure that hazardous waste is safely treated, stored, or disposed. First, Subtitle C requires the Agency to identify hazardous waste. Second, it creates a manifest system designed to track the movement of hazardous waste. and requires hazardous waste generators and transporters to employ appropriate management practices as well as procedures to ensure the effective operation of the manifest system. Third, owners and operators of treatment, storage, and disposal facilities must comply with standards the Agency established under section 3004 of RCRA that "may be necessary to protect human health and the environment." Ultimately, these standards will be implemented exclusively through permits issued to owners and operators by authorized States or the Agency. However, until these permits are issued, existing facilities are controlled under the interim status regulations of 40 CFR Part 265 that were largely promulgated on May 19, 1980. Under RCRA interim status, the owner or operator of a facility may operate without a permit if: (1) It existed on November 19, 1986. (or it existed on the effective date of statutory or regulatory changes under RCRA that render the facility subject to the requirements to have a permit under section 3005); (2) he has complied with the notification requirements of section 3010 of RCRA: (3) he applied for a permit (Part A application) in accordance with section 3005 of RCRA. Interim status is retained until the regulatory agency makes a forma! decision to issue or deny the permit or until the facility loses its interim status by statute for failure to submit Part B permit application and/or certification of compliance with applicable groundwater monitoring and financial assurance requirements.

assurance requirements.

In regulations promulgated on July 26, 1982. [40 CFR Part 264, 47 FR 32274], the Agency established permitting standards in 40 CFR Part 264 covering the treatment, storage, and disposal of hazardous wastes in surface impoundments, waste piles, land treatment units, and landfills. Owners and operators of such facilities must meet these standards to receive RCRA permits. Also included in the Federal Register on that date were a series of changes to the interim status requirements of Part 265, which were promulgated to ensure consistency with

the new Part 264 standards. There were, however, a few additional Part 265 conforming changes that the Agency believed should first be proposed for public comment because, in most cases. the public had not had sufficient opportunity to comment on the appropriateness of applying them during the interim status period. Many of the changes that were proposed on July 26. 1982, were promulgated in final regulations on April 23, 1985 (50 FR 16044). Today, the Agency is making final the remaining changes to the surface impoundment closure and postclosure care requirements (§ 265.228) that were proposed on July 26, 1982

#### III. Discussion of Today's Amendments

The Part 264 rules issued on July 26. 1982, for surface impoundment closure and post-closure care (§§ 264.228 and 264.310) are in many ways similar to the interim status requirements (§§ 265.228 and 265.310). The Part 264 closure rules. however, contain more specific performance standards to assure adequate protection of human health and the environment. For reasons discussed below, the Agency believes the more explicit Part 264 closure rules should also be implemented during interim status. Moreover, EPA believes that the closure process is adequate to apply these closure requirements. The existing review process for interim status closure and post-closure care plans will provide an opportunity for the Agency to review the specifics of the plans for compliance with the closure performance standards. Thus, any problems with misinterpretation of the closure requirements by the owner or operator would be identified and rectified prior to actual closure. In fact. the review process for closure and postclosure care plans during interim status is similar to the review process of closure and post-closure care plans conducted during the permitting process. Therefore, the Agency believes that these closure requirements are capable of being properly implemented during interim status.

The § 265.228 closure rules proposed on July 26, 1982, and promulgated today, retain the basic format of existing regulations by allowing owners and operators to choose between removing hazardous wastes and waste residues (and terminating responsibility for the unit) or retaining wastes and managing the unit as a landfill. (An additional choice for closure is proposed elsewhere in today's Federal Register.) The requirements for both choices are made more specific in today's amendments.

Alessi Kasaga OHe

If the owner or operator chooses not to remove or decontaminate the waste and waste residues, then the rules promulgated today provide that the owner or operator must: (2) Eliminate free liquids by either removing them from the impoundment or solidifying them. (2) stabilize the remaining waste and waste residues to support a final cover. (3) install a final cover to provide long-term minimization of infiltration into the closed impoundment, and (4) perform post-closure care and groundwater monitoring.

The Part 265 regulations promulgated today (like the existing Part 264 regulations for permitted units) allow owners and operators of surface impoundments to remove or decontaminate wastes to avoid capping and post-closure care requirements (§ 265.226(a)(1)). They must remove or decontaminate all wastes, waste residues, contaminated containment system components (e.g., contaminated portions of liners), contaminated subsoils, and structures and equipment contaminated with waste and leachate. All removed residues, subsoils, and equipment must be managed as hazardous waste unless there is compliance with the delisting provisions of § 261.3(d). (Similar Part 265 closure and post-closure care rules for waste piles were promulgated on July 26, 1982.)

The new requirements for closure by removal differ significantly from the previous Part 265 requirements in one respect. The previous interim status requirement in § 265.228(b) required owners or operators to remove all waste residuals and contaminated soil or to demonstrate, using the procedures in § 261.3 (c) and (d), that the materials remaining at any stage of the removal were no longer a hazardous waste. Once an owner or operator made a successful demonstration under § 261.3 (c) and (d), (s)he could discontinue removal and

certify closure.

Under § 261.3 (c) and (d), materials contaminated with listed waste (as evidenced by the presence of Appendix VIII constituents) are hazardous waste by definition unless the material is delisted. Materials contaminated with characteristic wastes, however, are only hazardous wastes to the extent that the material itself exhibits a characteristic. Thus to meet the old closure by removal standard, owners or operators of characteristic waste impoundments had only to demonstrate that the remaining material did not exhibit the characteristic that first brought the impoundment under regulatory control.

This demonstration, however, arguably allowed significant and potentially harmful levels of bazardous constituents (i.e., those contained in Appendix VIII of Part 261) to remain in surface impoundment units without subjecting the units to landfill closure, post-closure care, or monitoring

requirements.

For example, the previous version of the rule allowed residues from waste that originally exhibited the characteristic of extraction procedure (EP) toxicity to remain in place at "clean closure" If the residue was no longer EP toxic. This could allow an environmentally significant quantity of hazardous constituents to remain at a facility site that will receive no further monitoring or management. While EP toxic criterion would preclude only a concentration that exceeds 100 times the drinking water standard, constituents may remain at levels significantly above the drinking water standards. If such constituents are close to the saturated zone, they may contaminate ground water at levels exceeding the groundwater protection standard. Furthermore, the waste residues may contain significant and potentially harmful levels of other hazardous constituents (listed in Appendix VIII of Part 261) that are not found through EP testing. Hence, the language "or demonstrate what remains is no longer a hazardous waste" has been dropped from the interim status regulations because it is inconsistent with the overall closure performance standard requiring units to close in a manner that eliminates or minimizes the post-closure escape of Appendix VIII constituents.

Making this conforming change ensures that no Appendix VIII constituent presents any threat to human health and the environment. This is also consistent with several of the new requirements added by the Hazardous and Solid Waste Amendments of 1984. For example, new section 3004(u) of PCRA requires corrective action for releases not only of hazardous wastes, but also hazardous constituents. Similarly, section 3001(f) requires the Agency to consider, when evaluating waste delisting petitions, all hazardous constituents found in the waste, not just those for which the waste was listed as hazerdous. Finally. new section 3005(i) requires owners and operators of landfills, surface impoundments, waste piles, or land treatment units that qualify for interim status and receive waste after july 26. 1982, to meet the ground-water monitoring and corrective action standards found in Subpart F to 40 CFR Part 264. These regulations also require owners and operators to monitor and clean up the full range of Appendix VIII constituents found in a waste.

The question has also arisen during the implementation of previous closures by removal whether \$ 285.228 requires consideration of potential ground-water contamination in addition to soil contamination. The answer to this question is yes. The closure by removal requirements in § 265.228 (a)(1) and (b) require removal or decontamination (i.e. flushing, pumping/treating the aquifer) of "underlying and surrounding contaminated soils." Since contamination of both saturated and unsaturated soils may threaten human health or the environment, the Agency interprets the term "soil" broadly to include both unsaturated soils and soils containing ground water. Thus the closure by removal standard requires consideration of both saturated and unsaturated soils. Uncontaminated ground water is, therefore, a requirement for "clean closure" under Part 265 (and Part 264) as revised today as well as under the previous regulation.

The one comment received on the proposed § 285.228 surface impoundment closure and post-closure care requirements for "clean closure" argued that clay liners should be allowed to remain in place at closure even if they are contaminated because their excavation is expensive and hazardous to workers removing the waste. EPA disagrees. While excavation may be expensive, the additional cost of removing the liner will usually be small in comparison to the cost of removing the waste. Therefore, if an owner or operator is willing to expend the resources to remove the weste, it is not unduly burdensome to go one step further and remove the liner. This burden is justified by the benefit of removing contamination from the impoundment. (See discussion below.) If extensive excavation is needed, thereby considerably increasing the cost of removal, it is generally because extensive contamination of the clay and underlying soils has occurred. In these cases, it may be cheaper to install a proper final cover and perform postclosure care rather than remove the contamination. In addition, we do not believe that removal of the liner will be any more hazardous to workers than is the removal of the waste. With proper safety procedures, removal of the waste and liner should not pose an undue hazard to workers.

EPA's Interpretation of the "Remove or Decontaminate" Standard

The sole commenter on the proposed rule also suggested that, in addition to the case where all wastes, residues, and contaminated liners and soils are

removed, no final cover should be required where the type and quantity of . waste in the liner can be shown to pose; no public health or environmental threat. This comment touches upon an issue that has arisen in other contexts, that is: What is the necessary extent of removal or decontamination of wastes. waste residues, contaminated liners, and soils (including contaminated ground water) to avoid the landfill closure and post-closure care requirements under both Parts 264 and 265 regulations? The issue concerning how much removal or decontamination of wastes and waste residues is necessary to protect human health and the environment is relevant in a broad range of regulatory contexts currently being examined by the Agency including closure and corrective actions under RCRA and response actions under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) programs.

The removal and decontamination issue arises directly from differences in regulatory strategy between disposal and storage. A storage unit holds wastes temporarily, and the wastes are eventually removed for treatment or disposal elsewhere. The goal at closure is to leave no materials at the storage site that require further care. In contrast, a disposal unit, by definition, is closed with wastes and residues remaining at the site. The goal at closure is to assure. that these remaining wastes and residues are managed in a manner that protects human health and the environment. There is no need for postclosure oversight of storage units since all potentially harmful wastes and contaminated materials are removed. This is not true for disposal units; hence. the Agency has promulgated regulations requiring post-closure care for disposal units. (For further discussions on a proposed alternative closure option, see the preamble to proposed §§ 264.310 and 285.310 elsewhere in today's Federal Register).

To assist the reader, we describe below EPA's interpretation of the "remove and decontaminate" language ... in §§ 264.228 and 265.228, i.e. we describe the amount of removal or decontamination that obviates the need for post-closure care for both interim : status and permitted surface impoundment units. With regard to storage units regulated under both Parts 284 and 265, the Agency interprets the terms "remove" and "decontaminate" to mean removal of all wastes and liners. and the removal of leachate and materials contaminated with the waste . or leachate (including ground water)

that pose a substantial present or potential threat to human health or the environment. The Agency recognizes that at certain sites limited quantities of hezardous constituents might remain in the subsoil and yet present only insignificant risks to human health and the environment. Because regulations for storage facilities require no further post-closure care, the Agency must be certain that no hazardous constituents remain that could harm human health or the environment (now or in the future). To provide the necessary level of assurance, the Agency will require owners or operators to remove all wastes and contaminated liners and to demonstrate that any hazardous constituents left in the subsoils will not cause unacceptable risks to human health or the environment. The Agency will review site-specific demonstrations submitted by facility owners and operators that document that enough removal and decontamination has occurred so that no further action is necessary. Owners or operators wishing to avail themselves of the site-specific removal option must include in their closure plans specific details of how they expect to make the demonstration. including sampling protocols, schedules, and the exposure level that is intended to be used as a standard for assessing whether removal or decontamination is achieved (see discussion below). The Agency is presently developing a guidance document explaining the technical requirements for achieving a "clean closure". This guidance document should be available in draft form by January 1987. In the meantime. the following discussion presents the framework for the demonstration procedure.

The closure demonstrations submitted by facility owners and operators must document that the contaminants left in the subsoils will not impact any environmental media including ground water, surface water, or the atmosphere in excess of Agency-recommended limits or factors, and that direct contact through dermal exposure, inhalation, or ingestion will not result in a threat to human health or the environment. Agency recommended limits or factors are those that have undergone peer review by the Agency. At the present time these include water quality standards and criteria (Ambient Water Quality Criteria 45 FR 79318, November 28, 1980; 49 FR 5831, February 15, 1984; 50 FR 30784, July 29, 1985), health-based limits based on verified reference doses (RfDs) developed by the Agency's Risk Assessment Forum (Verified Reference Doses of USEPA, ECAO-CIN-475.

January 1986) and Carcinogenic Potency Factors (CPF) developed by the Agency's Carcinogen Assessment Group (Table 9-11, Health Assessment Document for Tetrachloroethylene (Perchloroethylene) USEPA, OHEA/600/8-82/005F, July 1985) to be used to determine exposure at a given risk, or site-specific Agency-approved public health advisories issued by the Agency for Toxic Substance and Disease Registry of the Center for Disease Control, Department of Health and Human Services.

The Agency is currently compiling toxicity information on many of the hazardous constituents contained in Appendix VIII to Part 261. The facility owner and operators should check with the Office of Solid Waste. Characterization and Assessment Division, Technical Assessment Branch (202) 382-4761 for the latest toxicity information. However, for some hazardous constituents, formally recommended exposure limits do not yet exist. If no Agency recommended exposure limits exist for a hazardous constituent then the owner or operator must either remove the constituent down to background levels, submit data of sufficient quality for the Agency to determine the environmental and health effects of the constituent, or follow landfill closure and post-closure requirements. Data submitted by the owner or operator on environmental and health effects of a constituent should, when possible, follow the toxicity testing guidelines of 40 CFR Parts 797 and 798 (50 FR 39252, September 27, 1985). The Agency does not believe there are many situations where developing exposure levels will be a realistic option for owners and operators because the testing required by 40 CFR Parts 797 and 798 to produce reliable toxicity estimates is expensive and time-consuming.

The Agency believes it is necessary to present policy on the appropriate point of exposure for the various pathways of exposure in order to provide some national consistency in dealing with the potential impacts of the release of hazardous constituents from closing units. The following point of exposure was chosen because the Agency believes it represents a realistic and at the same time reasonably conservative estimate of where either environmental or human receptors could be exposed to the contaminants released from the unit. For the purpose of making a closure by removal demonstration, the potential point of exposure to hazardous waste constituents is assumed to be directly at or within the unit boundary for all

routes of exposure (surface-water contact, ground-water ingestion, inhalation, and direct contact). Potential exposure at or within the unit boundary must be assumed because no further oversight or monitoring of the unit is required if the unit is closed by removal. (Recall that the land overlying a unit that closes by removal may be transferred and developed freely without giving notice of its prior use.) Therefore, no attenuation of the hazardous waste constituents leaching from the waste residues can be presumed to occur before the constituents reach exposure points.

This approach differs from the existing "delisting procedure" developed in response to the requirements of §§ 281.3 (c) and (d), 260.20, and 280.22. As discussed previously, the "clean closure" approach is based on the premise that, after closure by removal is satisfied, no further management control over the waste (or unit) is necessary. In contrast, delisted solid waste remains subject to the regulatory controls promulgated by the Agency under Subtitle D of RCRA. Subtitle D contains performance criteria for the management of non-hazardous waste. Although the Agency is currently assessing whether more specific Federal regulatory requirements are needed for waste management under Subtitle D. most states have already adopted specific regulatory requirements for Subtitle D waste management. Therefore, even though a waste may be delisted its management continues to be controlled. In contrast, closure by removal will not be followed by any regulatory controls; hence, an environmentally conservative approach is needed to assure no further risk to human health and the environment. Therefore, unlike the current "delisting procedure" that is based on a generic process that only considers the groundwater route of exposure, the demonstration procedure discussed here is waste-specific and site-specific. considers all potential exposure pathways, and assumes no attenuation.

The demonstration should be conservative in the sense that it climinates the uncertainties associated with contaminant fate and transport, focusing on the waste contaminant levels and contaminant characteristics. Therefore, arguments relying on fate and transport calculations will not be accepted. The Agency is pursuing this relatively conservative approach at this time because we are confident that it will be protective of human health and the environment. After a few years of experience with "clean closure"

demonstrations, the Agency may decide procedure is insufficient for this that a less stringent approach is sufficiently reliable to assure that closures based on such analyses are fully protective of human health and the environment. At that time, the Agency may change its position on the use of fate and transport arguments for "clean closure" demonstrations. (Elsewhere in today's Federal Register, the Agency is proposing a third closure option that would incorporate fate and transport factors. However, unlike the closure by removal option, that option would require closure to be followed by verification monitoring to verify the fate and transport predictions and assume that the closure protects human health and the environment.)

To make the demonstration with respect to the direct contact pathway. owners or operators must demonstrate that contaminant levels in soil are less than levels established by the Agency as acceptable for ingestion or dermal contact. Total waste constituent levels in soil should be used for this analysis. Arguments based on exposure control measures such as fencing or capping will not be acceptable since the longterm future use of the property cannot be reliably controlled and hence the long-term effectiveness of these measures is uncertain.

To make the demonstration with respect to the ground-water pathway. owners or operators must remove enough contaminated soil and saturated subsoils (i.e., ground water) to demonstrate that constituent levels in ground water do not exceed Agencyestablished chronic health levels (based on Rfd or CPF values) and that residual contaminant levels remaining in the soil will not contribute to any future contamination of ground water. (Note: this demonstration may in some cases require constituent-specific ground water data beyond that required by §§ 265.90 through 2165.100). The demonstration related to residual soil contamination levels must show that levels of constituents found in leachate from the residual soil contamination are not above Agency-established exposure levels. Levels of constituents in leachate may be estimated based on known characteristics of the waste constituents (e.g., solubility and partitioning coefficients) or determined by the results of actual soil leaching tests. The Agency is exploring the appropriateness of using the extraction procedures (but not the ac \_\_\_ble contaminant levels) found in the Toxicity Characteristics Leaching Procedure (TCLP), Federal Register of January 14, 1985 (51 FR 1690). The current EP Toxicity leaching

demonstration because it does not capture the organic constituents in the waste.

The analysis of potential air exposures should assess contaminants migrating from the soils into the atmosphere. The demonstration should include emission calculations, available monitoring data, and safe inhalation levels based on Agency-established exposure levels.

The potential surface water exposure . analysis should compare Agencyestablished water quality standards and criteria [45 FR 78318, November 28, 1980) with the levels of constituents that may leach from the residual contaminated soil. Tests described previously should be used to estimate the level of constituents in the leachate. The surface water exposure analysis should also consider existing surface water contaminant concentrations.

#### IV. State Authority .

A. Applicability of Rules in Authorized Stotes

Under section 3006 of RCRA, EPA may authorize qualified States to administer and enforce the RCRA program within the State. (See 40 CFR Part 271 for the standards and requirements for authorization.) Following authorization, the Agency retains enforcement authority under sections 3008, 7003 and 3013 of RCRA, although authorized States have primary enforcement responsibility.

Prior to the Hazardous and Solid Waste Amendments of 1984 (HSWA), a State with final authorization administered its hazardous waste program entirely in lieu of the Federal program. The Federal requirements no longer applied in the authorized State. and the Agency could not issue permits for any facilities in a State where the State was authorized to permit. When new, more stringent Federal requirements were promulgated or enacted, the State was obligated to enact equivalent authority within . specified time frames. New Federal requirements did not take effect in an authorized State until the State adopted the requirements as State law.

In contrast, under section 3006(g) of RCRA, 42 U.S.G. 6926(g), new requirements and prohibitions imposed by HSWA take effect in authorized States at the same time that they take effect in nonauthorized States. The Agency is directed to carry out those requirements and prohibitions in authorized States, including the Issuance of permits, until the State is granted

#### Appendix H Closure Certification

#### CERTIFICATION

I Certify under penalty of law that this document and all attachments were reviewed by me or under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Signature

66890226

12/22/89



#### INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

105 South Meridian Street P.O. Box 6015

46206-6015 Indianapolis

Telephone 317/232-8603

freeling



VIA CERTIFIED MAIL - P730-169-866

Mr. Michael T. Scanlon Director of Environmental Services Ulrich Chemical, Inc. 3111 North Post Road Indianapolis, Indiana 46226-6566

Re: Closure Certification Report

Ulrich Chemical, Inc. Evansville, Indiana IND 044198034

Dear Mr. Scanlon:

The Indiana Department of Environmental Management (IDEM) acknowledges receipt of the Closure Certification Report for the Ulrich, Evansville, Indiana, facility on December 27, 1989. A review of the report has revealed the following discrepancies between the approved closure plan and the plan's implementation.

- 1. Table 1 of the closure plan indicates that analysis for VOC's will be performed using SW-846 test method 8240. Whereas, Table 1 of the report indicates that SW-846 test methods 8010 and 8020 were used for VOCs.
- 2. The evaluation of the analytical results obtained from the soil sampling within the past storage area is in error. The report incorrectly states that the action level for VOCs is a detection limit at 1 mg/kg. The approved closure plan established the clean-up level for VOCs as the detection limit. Modification number two corrected a typographical error in Table 3 of the plan so that the detection limit for VOCs read ug/l not mg/l. A qualified laboratory using the proper procedure, i.e. 8240, should achieve a detection limit of 5 to 10 ppb.

#### CORPORATE OFFICE

3111 NORTH POST ROAD INDIANAPOLIS 46226-6566 (317) 898-8632 FAX (317) 895-0614

# UILIRII (CIHIEMIII (CAIL, IIN) (C.



BRANCHES
EVANSVILLE
TERRE HAUTE
FORT WAYNE
LOUISVILLE

December 21, 1989

Mr. Vic Windle
Office of Solid and Hazardous Waste Management
Indiana Department of Environmental Management
105 South Meridian Street
Indianapolis, IN 46206-6015

044 198 034 mactive

Dear Mr. Windle:

Pursuant to 329 IAC 3-21-6, Ulrich Chemical, Inc. hereby provides its certification that the storage units located at it's Evansville facility have been closed in accordance with the specifications in the approved closure plan. The enclosed report provides the IDEM with documentation that supports this certification. Further, Ulrich Chemical, Inc. has disposed of the rinse water left under our control and generated as a result of the closure activities.

Within 60 days of the IDEM's receipt of this report, Ulrich Chemical, Inc. expects to receive written notice from the IDEM that it is no longer required to maintain any financial assurance for closure as required by 329 IDC 3-22-12.

If you have any questions or require additional information, please feel free to contact me at 317-898-8632.

Sincerely,

Michael T. Scanlon

Director of Environmental Services

MTS/js

Enclosure